‘A CLINICAL STUDY ON ACUTE INTESTINAL OBSTRUCTION’

DISSERTATION SUBMITTED TO

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

CHENNAI

In partial fulfilment of

the requirements for the degree of

MASTER OF SURGERY

In

GENERAL SURGERY

DEPARTMENT OF GENERAL SURGERY

TIRUNELVELI MEDICAL COLLEGE

TIRUNELVELI

APRIL-2016

CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled "**A CLINICAL STUDY ON ACUTE INTESTINAL OBSTRUCTION**" is a bonafide research work done by **DR. KISHORE KUMAR K**, Post Graduate M.S student in Department of General Surgery, Tirunelveli medical college & Hospital, Tirunelveli, in fulfilment of the requirement for the degree of Master of Surgery in General Surgery.

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PRINCIPAL INVESTIGATOR: Dr. KISHORE KUMAR, MBBS.,

DESIGNATION OF PRINCIPAL INVESTIGATOR: POST GRADUATE IN GENERAL SURGERY
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Dear , Dr.Kishore Kumar, MBBS., The Tirunelveli Medical College Institutional Ethics Committee (TIREC) reviewed and discussed your application during the IEC meeting held on 09.02.15.

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1. TIREC Application Form ☐
2. Study Protocol ☐
3. Department Research Committee Approval ☐
4. Patient Information Document and Consent Form in English and Vernacular Language ☐
5. Investigator's Brochure ☐
6. Proposed Methods for Patient Accrual Proposed ☐
7. Curriculum Vitae of the Principal Investigator ☐
8. Insurance /Compensation Policy ☐
9. Investigator's Agreement with Sponsor ☐
10. Investigator's Undertaking ☐
11. DCGI/DGFT approval ☐
12. Clinical Trial Agreement (CTA) ☐
13. Memorandum of Understanding (MOU)/Material Transfer Agreement (MTA) ☐
14. Clinical Trials Registry-India (CTRI) Registration ☐

THE PROTOCOL IS APPROVED IN ITS PRESENTED FORM ON THE FOLLOWING CONDITIONS

1. The approval is valid for a period of 2 year/s or duration of project whichever is later
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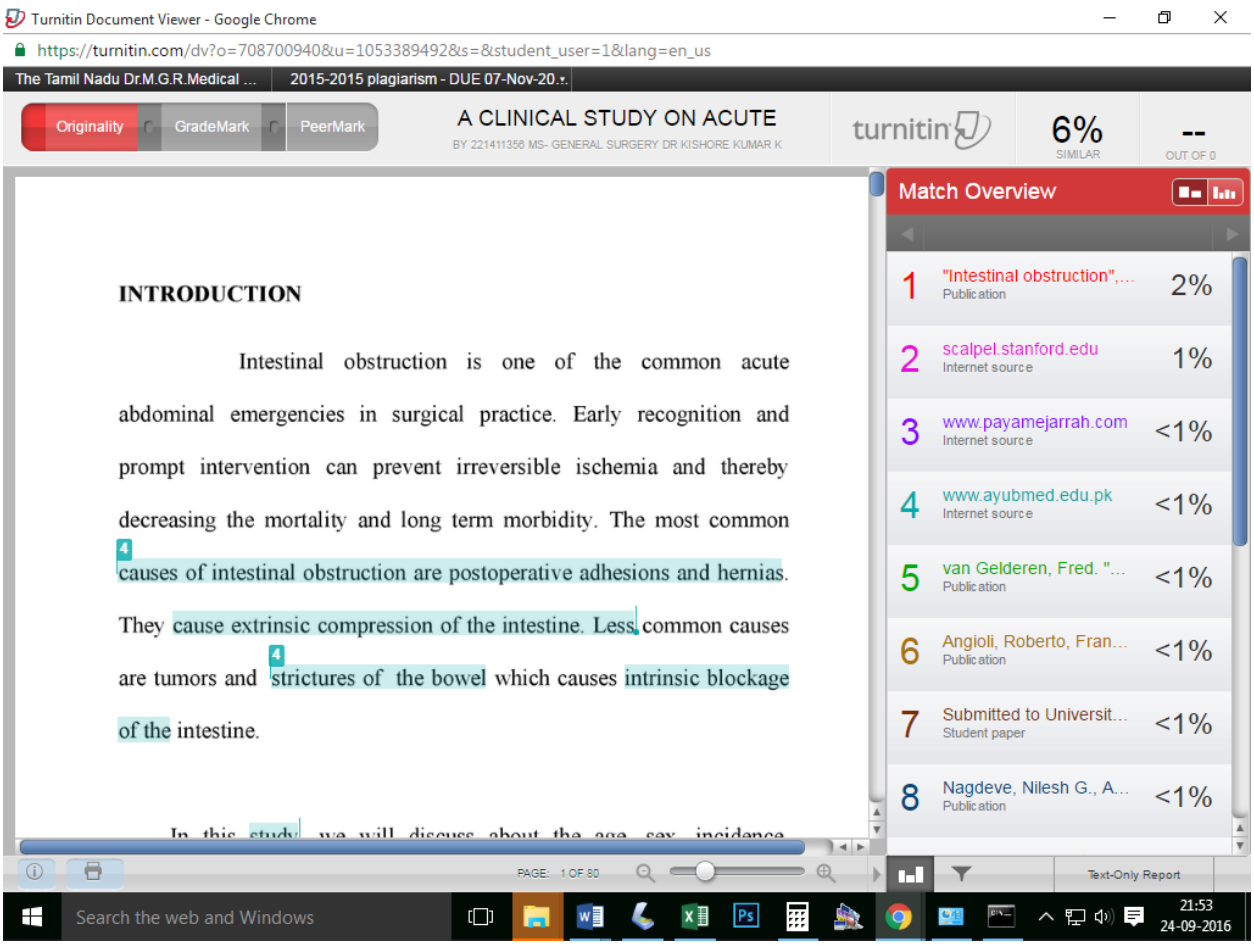
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INTRODUCTION
Intestinal obstruction is one of the common acute abdominal emergencies in surgical practice. Early recognition and prompt intervention can prevent irreversible ischemia and thereby decreasing the mortality and long term morbidity. The most common causes of intestinal obstruction are postoperative adhesions and hernias. They cause extrinsic compression of the intestine. Less common causes are tumors and strictures of the bowel which causes intrinsic blockage of the intestine.
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CONTENTS

INTRODUCTION

Intestinal obstruction is one of the common acute abdominal emergencies in surgical practice. Early recognition and prompt intervention can prevent irreversible ischemia and thereby decreasing the mortality and long term morbidity. The most common causes of intestinal obstruction are postoperative adhesions and hernias. They cause extrinsic compression of the intestine. Less common causes are tumors and strictures of the bowel which causes intrinsic blockage of the intestine.

In this study, we will discuss about the age, sex, incidence, etiology, clinical features, management and outcomes of acute intestinal obstruction in adults.

AIMS AND OBJECTIVES:

- To study the incidence and various etiology of intestinal obstruction.
- To study the various modes of presentation, importance of early diagnosis and management.
- To study the role of imaging studies in determining the site and etiology.
- To study the mortality rate and the morbidity rate in acute intestinal obstruction.

REVIEW OF LITERATURE:

DEFINITION:

It is defined as partial or complete blockage of either small intestine or large intestine or both resulting in failure of intestinal contents to pass beyond the point of obstruction. In other words intestinal obstruction occurs when the normal propulsion of intestinal contents does not occur.

HISTORICAL BACKGROUND

The history of intestinal obstruction dates back to third or fourth centuries. Hippocrates was the first to describe and treat intestinal obstruction. Praxagoras was the first surgeon who did enterocutaneous fistula for intestinal obstruction. Till 1800's non-operative managements like hernia reduction, ingestion of laxatives and heavy metals was practiced in most parts of the world.

In 17th century, Heister did a resection of a strangulated bowel with diversion. He was followed by Pillare who did caecostomy for rectal malignancy. In 19th century Henri Hartmann described Hartmann's procedure.

Recent advances made in the field of minimally invasive surgery have shown that laparoscopic approach for acute intestinal obstruction was found to be effective in selected group of patients.

SURGICAL ANATOMY:

SMALL INTESTINE:

The small intestine is the longest part of GIT. It extends from the duodenum to ileocaecal junction. Small intestine measures 6metres. It consists of the duodenum, jejunum and ileum.

1)DUODENUM:

It is the first part of small intestine. It measures 20-25cm. It is the widest part of the small bowel. It is retroperitoneal except for the first part. It has characteristic mucus secreting glands called Brunner glands. The duodenum consists of four parts.

1. First part: It extends from the pyloric orifice of the stomach. Length is about 5cms. Most duodenal ulcers are found to occur in this part.
2. Second part: It occupies right paramedian position. It extends from gall bladder neck to the lower border of L3 vertebra. Length is about 7.5cms.

3. Third part: It lies in front of IVC, the aorta and the vertebral column. Length is about 10cms.
4. Fourth part: It runs upwards and terminates in duodenojejunal flexure. Length is about 2.5cms.

2) JEJUNUM:

The length of jejunum and ileum altogether is 4-6metres. The jejunum constitutes the proximal two-fifths. It is larger in diameter and has a thicker wall than ileum. Compared to ileum the arterial arcades are less prominent and the vasa recta are longer.

3)ILEUM:

The ileum makes up the distal fifth of the small intestine. Compared to jejunum, ileum has abundant mesenteric fat, short vasa recta, thin walls and increased number of arterial arcades. It has the narrowest lumen of small bowel. It terminates at the ileocaecal junction which is guarded by the ileocaecal valve internally.

LARGE INTESTINE:

It extends from the terminal end of ileum to anus. Large intestine measures approximately 1.5m. The parts of large intestine include caecum, appendix, ascending colon, transverse colon, descending colon and sigmoid colon.

The caecum is the first part. It is a blind pouch. It is intraperitoneal and is continuous with ascending colon at the entrance of ileum.

The appendix is a narrow, blind ending tube that is connected to the caecum. Appendix usually measures 6 to 9 cm. Its wall contains large aggregation of lymphoid tissue. Appendix is suspended by mesoappendix from the terminal ileum, which contains the appendicular vessels. The three taenia coli merge into base of the appendix.

Ascending colon and the descending colon are retroperitoneal. Transverse colon and the sigmoid colon are intraperitoneal. Sigmoid colon ends at the level of S3 vertebra where it is continues as rectum.

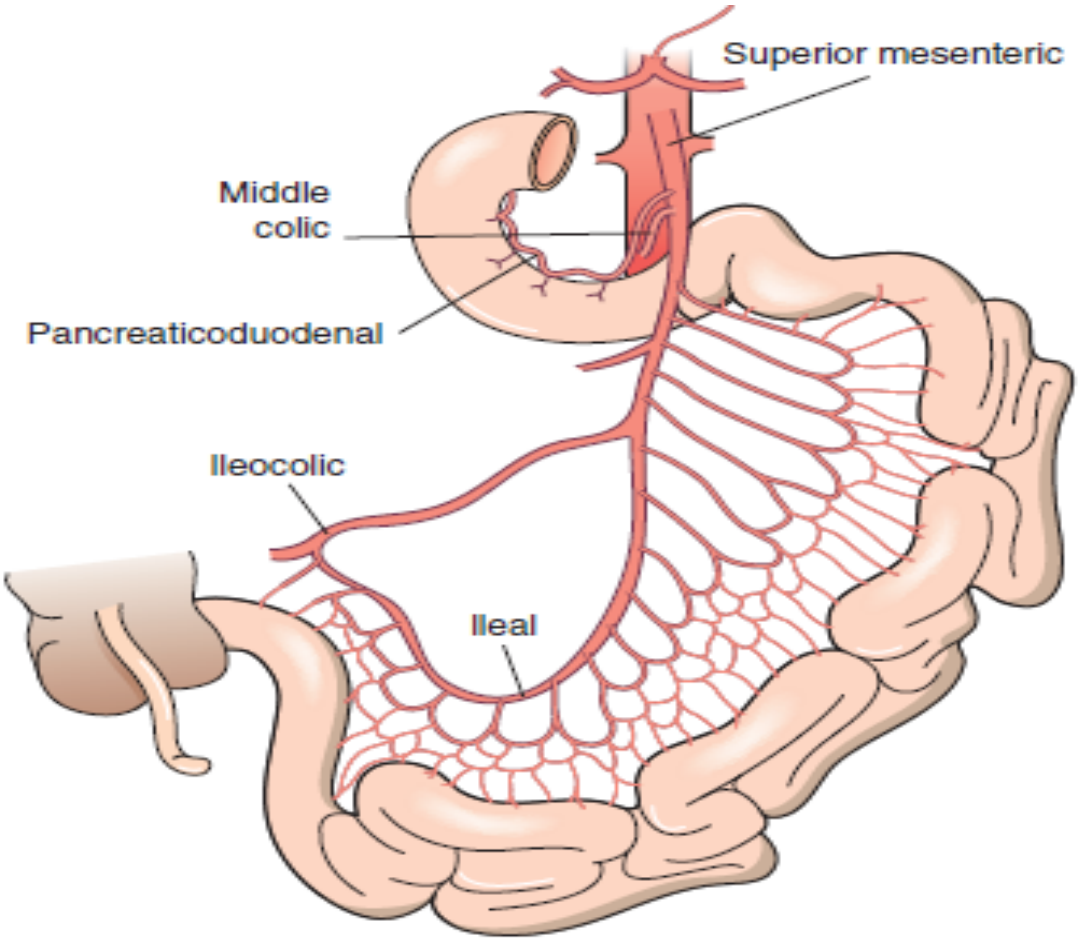
The colon is distinguished from small bowel by appendices epiploicae**,** taenia coli and haustrations. Taenia coli runs along the entire length of the large intestine. They are responsible for sacculations of the large bowel.

The right ureter, right gonadal vessels and duodenum lies behind caecum and ascending colon. The left ureter, left gonadal vessels and the tail of the pancreas lies behind left colon. Hence careful dissection is done to avoid injury to these vital structures.

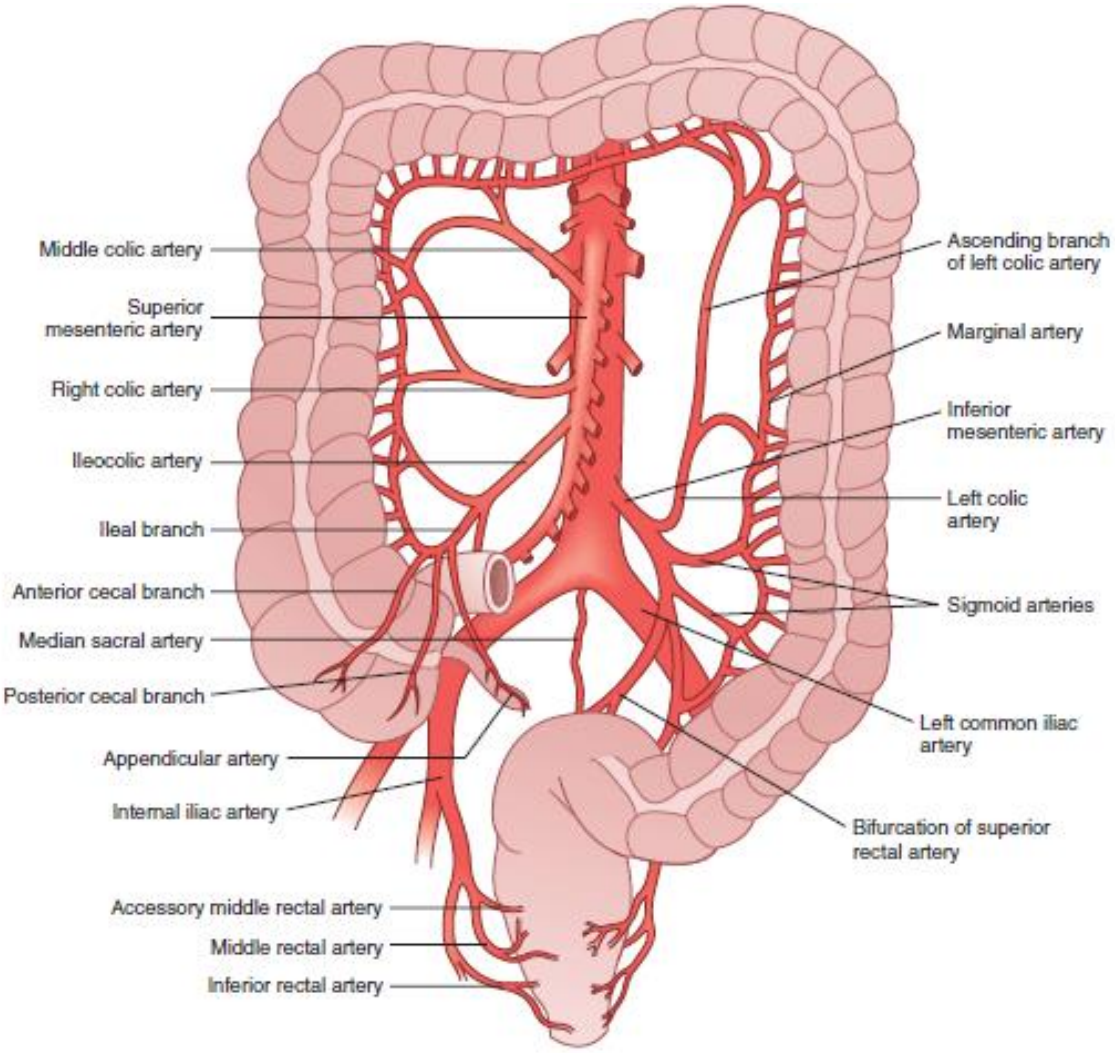
BLOOD SUPPLY OF GIT:

- Celiac artery supplies proximal half of duodenum.
- Superior Mesentric Artery supplies the rest of duodenum, the jejunum, the ileum, the ascending colon and proximal 2/3rd of transverse colon.
- Inferior Mesentric Artery supplies distal one-third of transverse colon, the descending colon, the sigmoid colon and most of the rectum.

BLOOD SUPPLY OF SMALL BOWEL



BLOOD SUPPLY OF COLON



VENOUS DRAINAGE:

- ✓ Duodenum drains into splenic vein, which in turn drains into superior mesenteric vein and then into portal veins.
- ✓ Small intestine and large intestine upto transverse colon drains into the superior mesenteric vein.
- ✓ The rectum, sigmoid colon,descending colon and splenic flexure drains into inferior mesenteric vein. It originates as superior rectal vein and ascends receiving tributaries from sigmoid and left colic vein.
- ✓ The lower third of rectum and anal canal drains into middle rectal vein and the inferior rectal veins which drains into internal iliac veins.

LYMPHATIC DRAINAGE:

Lymphatics of the small intestine runs parallel to their corresponding arteries. This lymph drains into mesenteric lymph nodes then into the cisterna chili. The thoracic duct finally terminates in left subclavian vein.

The lymphatics of the colon originates in the muscularis mucosa. Lymph nodes on the bowel wall are the epicolic nodes**.** The lymph nodes situated along the inner margin of the bowel lying near the arterial arcades are the paracolic nodes. The nodes around the main mesenteric vessels are the intermediate nodes.

The lymph nodes at the origin of superior mesenteric and inferior mesenteric arteries are the main nodes**.**

NERVE SUPPLY:

The parasympathetic supply of is from vagus and the sympathetic innervation is from splanchnic nerves.

- ✓ The colon is innervated by both sympathetic nerves (T6-T12 and L1-L3) and parasympathetic nerves(vagus nerve and sacral nerves S2-S4 from the nervi erigentes).
- ✓ The sympathetic nerves and the parasympathetic nerves both innervate the anorectum. Sympathetic nerve fibres are from L1-L3. Parasympathetic nerve fibres or the nervi ergentes arises from S2-S4.

CLASSIFICATION OF INTESTINAL OBSTRUCTION

Intestinal obstruction can be classified in the following ways,

1.Based on the site of obstruction as,

a) Proximal obstruction

b) Distal obstruction

c) Large bowel obstruction

2. Based on the etiology as,

a)mechanical obstruction

b) functional obstruction

3. Based on the time of presentation as;

a) Acute and

b) chronic intestinal obstruction

4. Based on the extent of obstruction as,

a)complete

b) partial

5. Mechanical obstruction can be,

a) Extraluminal

b) Intraluminal

c) Intramural

ETIOLOGY:

The etiology of intestinal obstruction is either mechanical(dynamic) or functional(adynamic).

The cause of dynamic obstruction are the following,

1)Lesions outside the intestinal wall:

A) ADHESIONS

1) Post operative
2) Congenital
3) Post inflammatory

B) HERNIA

1. Internal hernia includes paraduodenal, foramen of Winslow, diaphragmatic, mesenteric defect, paracaecal, intersigmoid, broad ligament.
2. External hernia includes inguinal, femoral, umbilical, ventral,epigastric, lumbar, interstitial hernia.

3. Incisional hernia

C) CONGENITAL

1) Malrotation

2) annular pancreas

D) NEOPLASTIC

1) Extra intestinal neoplasm

2) carcinomatosis

E) INFLAMMATORY- intra abdominal abscess

F) MISCELLANEOUS

1) volvulus

2) gossypiboma

3) superior mesenteric artery syndrome.

2)Lesions in the intestinal wall:

A) CONGENITAL

1) Meckel's diverticulum

2) Intestinal atresia

3) Duplications/cysts

B) INFLAMMATORY

1) Crohn's disease

2) Eosinophilic granuloma

C) INFECTIONS

1) Tuberculosis

2) Actinomycosis

D) NEOPLASTIC

Primary/ metastatic

E)MISCELLANEOUS

1) intussusception

2) endometriosis

3) radiation enteropathy 4) ischaemic stricture

3)Lesions in the lumen:

1) gallstone ileus

2) roundworm

3) meconium ileus

4) phytobezoar

The causes of functional bowel obstruction are the following,

1.Intra-abdominal causes

A) INTRAPERITONEAL CAUSES

1)Peritonitis

2) Abscess

3)Postoperative

4) Autoimmune

5) Intestinal ischemia

B) RETROPERITONEAL CAUSES

1)Metastasis

2)Urolithiasis/Pyelonephritis

3) Pancreatitis 4) Retroperitoneal trauma/hematoma

2.Extra-abdominal causes

A) THORACIC CAUSES

1) Myocardial infarction

2) congestive heart failure

3)Pneumonia

4) trauma

B) METABOLIC ABNORMALITIES

1)Electrolyte imbalance

2)sepsis

3) Lead poisoning

4)Porphyria

5)ketoacidosis

6)Hypothyroidism

7)Uremia

C)DRUGS

1) Anticholinergics

2) Antihistamines

3) Opiates

4)Alpha adrenergic agonists

5)catecholamines

D)MISCELLANEOUS

1) Spinal cord injury

2) Pelvic fracture

3) Head trauma

4) Chemotherapy

5) Radiation therapy

6) Renal transplantation

Among these postop adhesions, hernias and neoplasms account for most of the cases.

PATHOPHYSIOLOGAL CHANGES IN ACUTE BOWEL OBSTRUCTION

The pathophysiological changes that occur can be described as

1. Intestinal distension

Most of the gas distending the small bowel in early phases of obstruction accumulates from swallowed air. Other sources include: fermentation of sugars, production of carbon dioxide by interaction of gastric acid and bicarbonates in pancreatic and biliary secretions, and diffusion of oxygen and carbon dioxide from the blood.

Following dilatation and inflammation, activated neutrophils and macrophages accumulate in the bowel wall due to increased blood flow to the gut, these release reactive proteolytic enzymes, cytokines, and other locally active substances which inhibit or damage the secretory and motor processes of the gut.The nitric oxide produced during the process causes smooth muscle relaxation, further aggravating the distension and inhibiting gut contractility.

The normal intraluminal pressure of 2 to 4 cm of water rises to 8 to 10cm of water in obstruction, which may reach 30 to 60 cm of water in closed loop obstruction. The reactive oxygen radicals produced during these changes not only affect gut motility but also its permeability.

Two phases of obstruction were noted. During the first 12 hours, water and electrolytes accumulate within the lumen secondary to a decrease in absorption.

By 24 hours, intraluminal water and electrolytes accumulate more rapidly secondary to a further decrease in absorption and in addition to an increase in net Intestinal secretion secondary to mucosal injury and increased permeability.

The decrease in the absorptive Capacity and increase in intraluminal secretion leads to dehydration. Although the intestinal wall distal to the obstruction maintains normal function, the inability of the luminal content to reach the unobstructed gut aggravates the dehydration.

2. Intestinal Motility:

In the early phase of bowel obstruction, the contractile activity of the intestine increases to propel intraluminal contents to pass beyond the obstruction. Later, it diminishes due to intestinal wall hypoxia and exaggerated intramural inflammation. The alterations in intestinal motility are secondary to a disruption of the normal autonomic, parasympathetic (vagal) and sympathetic, splanchnic innervation.

It is also proposed that loss of functions of interstitial cells of cajalt affect gut motility during intestinal obstruction.

3. Circulatory Changes

Ischemia of the bowel wall can occur by different mechanisms.

- ✓ Extrinsic compression of the mesentery by adhesions, fibrosis, mass, twisting of a hernia defect, extrinsic pressure on a segment of bowel (e.g., a fibrous band), or progressive distension in the setting of a closed-loop obstruction can all cause vascular compromise or strangulation.
- ✓ Progressive distension of the bowel lumen with a concomitant increase in intraluminal pressure results in increased transmural pressure on capillary blood flow.
- ✓ Strangulating obstruction progresses to infarction and then to gangrene in 6 hours, if left untreated. First Venous occlusion occurs , then arterial occlusion, ultimately resulting in rapid ischemia of the bowel. The bowel wall becomes fragile, edematous resulting in perforation. It is more common in caecum and ascending colon where the luminal diameter is greatest and (by Laplace's law) the wall tension (and ischemia.) is also maximum.

4. Microbiological changes and Bacterial Translocation

The upper small intestine contains gram-positive facultative organisms in small concentrations. More distally, the bacterial count increases in

concentration in the distal ileum, with flora changing primarily to coliforms and anaerobes.

In the presence of obstruction, bacteria proliferate rapidly proximal to the obstruction in direct proportion to the duration of obstruction.Toxins produced by these bacteria disrupt the mechanical integrity of the gut mucosa. Once the gut mucosal barrier is lost, bacterial translocation occurs as the luminal bacteria invade the submucosa and enter the systemic circulation via the portal venous and lymphatic systems.

CLINICAL FEATURES

Cardinal features of intestinal obstruction are:

1. Abdominal pain
2. Vomiting
3. Abdomen distension
4. Constipation

1. Abdominal pain

Abdominal pain is the first symptom. The onset may be insidious or abrupt in simple obstruction, but with strangulation the onset is usually sudden and severe.

The pain is diffuse, poorly localized and is felt across the upper abdomen in high obstruction, at the level of the umbilicus in low ileal obstruction, in the lower abdomen in colonic obstruction and in the perineum as well as in rectosigmoid obstruction.

In high intestinal obstruction (the period between attacks of pain is short 3-5 minutes), whereas it is longer in low obstruction (15 to 20 minutes).

2. Vomiting

Vomiting is the next most common symptom. A constant symptom, the early vomiting is reflex in nature followed by quiescent period before real vomiting due to obstruction resumes. This quiescent period is of shorter duration in high-level obstruction and longer in lower small bowel obstruction. As the disease progresses, the character of the vomitus changes from partially digested food to bilious vomiting. Finally it is faeculent.

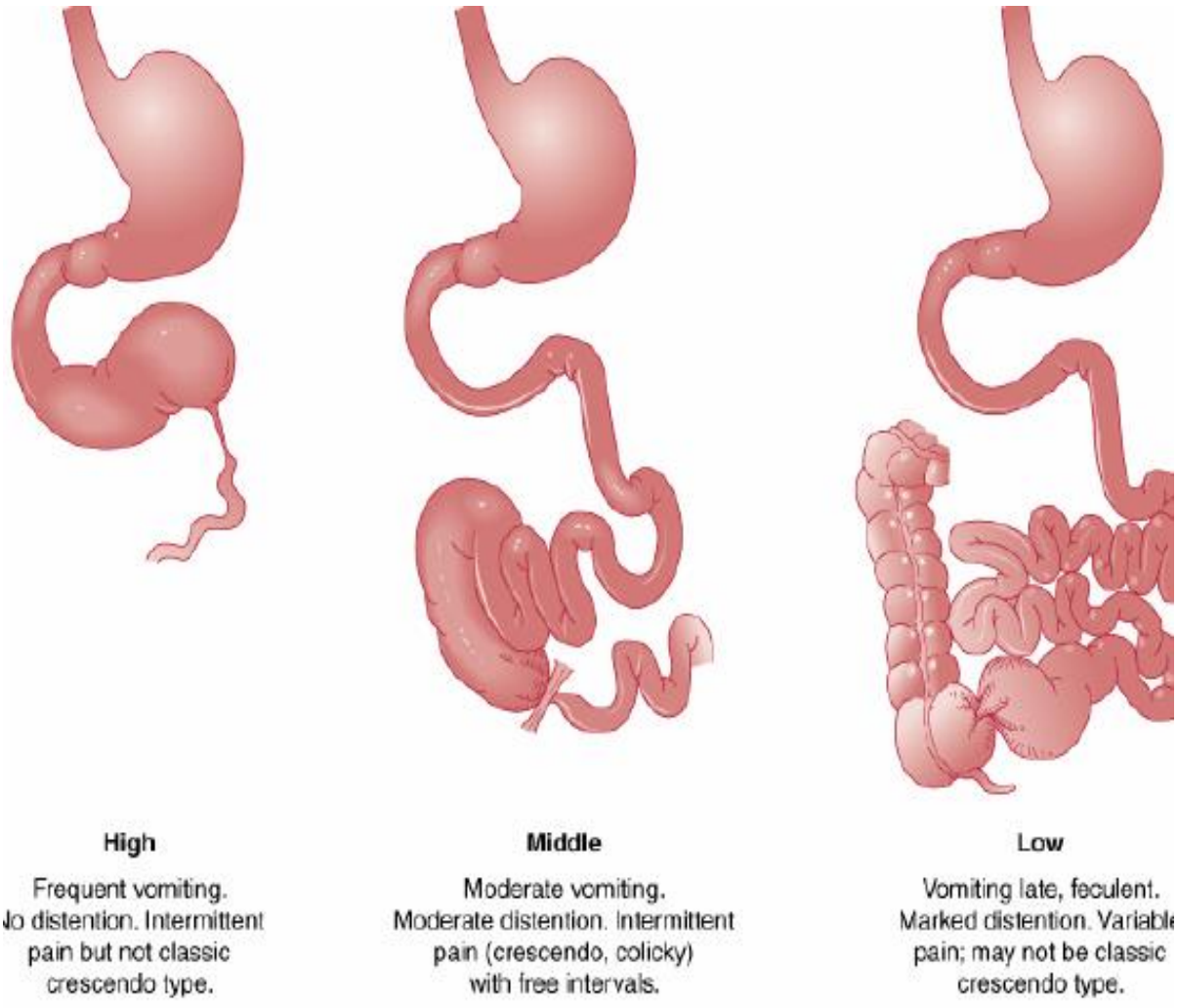
In high-level obstruction vomiting is frequent, copious and projectile, in low level small bowel obstruction vomiting is less projectile and less frequent. Vomiting is unusual in colonic obstruction. Reflex vomiting is unusual in colonic obstruction because the ileocaecal valve is competent. Colonic obstruction is characterized by foul smelling brown vomiting.

3. Distension

In early cases of obstruction distension is very slight or even absent. When the proximal jejunum is obstructed, the stomach becomes distended with gas and accumulated secretion, so that the epigastric region may, in later stages be more prominent and tense. When the ileum is involved, the central portion of the abdomen is moderately blown out and when the distal colon is blocked, there is considerable universal distension of abdomen, with well-marked

bulging in the flanks. Visible peristalsis may be present.

CLINICAL FEATURES



High

Frequent vomiting.
No distention. Intermittent
pain but not classic
crescendo type.

Middle

Moderate vomiting.
Moderate distention. Intermittent
pain (crescendo, colicky)
with free intervals.

Low

Vomiting late, feculent.
Marked distention. Variable
pain; may not be classic
crescendo type.

4. Constipation

In complete obstruction, there is constipation and usually neither faeces nor flatus is passed. It is called as absolute constipation. This rule does not apply in Ritcher's hernia, gall stone obstruction and mesenteric vascular occlusion.

History and physical examination

A detailed history and thorough physical examination will help in diagnosis and management of intestinal obstruction. In simple mechanical obstruction there will be very few abdominal signs. Whereas in strangulated obstruction, patient will be toxic, tachycardia and hypotension will be there. Any past history of abdominal surgery, acute cholecystitis, appendicitis or any other intraabdominal infections, suggests adhesion as a cause of obstruction. Hernia of long duration gives rise to strangulation, there may be one of the following history:

• Alternate diarrhoea and constipation with loss of weight suggests tuberculosis and malignancies.

• Recent onset of constipation suggests malignancy in elderly people.

Physical examination

Skin turgor: may be lost due to dehydration, may be cold and calmy.

Tongue: which may be dry and coated due to dehydration.

Nail and sclera: Anaemia, jaundice may be evident.

Rapid low volume pulse, low blood pressure, cold extremities, anxious lookand increased respiratory rate are the evidence of shock and septicaemia.

Examination of abdomen

• **Inspection:** On inspection previous surgical scars which indicates adhesions or cancer. In early stage visible peristalsis may be seen. All hernial orifices has to be looked.

• **Type of abdominal distension:** Central in small bowel obstruction and upper abdominal in high-level obstruction. Distension will be more in the flanks in colonic obstruction.

• **Type of peristalsis:** Central step ladder type of peristalsis seen in distal small bowel obstruction and right to left over the umbilicus in the colonic obstruction.

Palpation

• Abdomen must be examined for presence of any palpable mass, localized abdominal tenderness, rebound tenderness and mass is suggestive of strangulation.

In peritonitis there will be generalized rigidity and tenderness. During pain heaped up coils of intestine or prominent distended coils may be seen.

• **Auscultation:** In simple mechanical obstruction, sounds become loud, high pitched and metallic. In late stages bowel sounds may be absent due to paralysis of bowel musculature. Bowel sounds may be absent in strangulation and ileus or low-pitched tingling sounds may be heard due to movements of fluid from one coil to another.

• **Rectal examination:** To be performed in all cases of obstruction, may reveal faecal impaction, mass, red current bleeding in intussusception. A palpable pelvic mass or bulge due to collection in the Pouch of Douglas may be present. Ballooning of the rectum usually occurs in the intestinal obstruction may be due to obstruction to nerves causing sympathetic paralysis.

LABORATORY INVESTIGATIONS

(i) Hematological tests

A full blood count, packed cell volume, serum electrolyte determination and blood urea level should be done. Leucocytosis is indicative of strangulation, extremely high counts are highly suggestive of mesenteric thrombosis. Serum electrolyte estimation will guide for fluid management which is the initial management of intestinal obstruction. Metabolic acidosis seen in distal intestinal obstruction due to dehydration, ketosis and loss of alkaline secretions and metabolic alkalosis is seen in upper, intestinal obstruction due to considerable loss of acidic juice.

(ii) Urine examination

Specific gravity will give a rough idea of the amount of dehydration in case of intestinal obstruction.

(iii) Diagnostic aspiration

So important in the distinction between simple and strangulated obstruction, aspiration of peritoneal cavity with a fine needle in case of doubt and withdraw of blood stained fluid is diagnostic of strangulation. Root finds that significant increase in the polymorphonuclear count of peritoneal fluid can be detected within three hours after peritoneal invasion.

X-ray diagnosis

In all cases, 'Scout' film of the abdomen, with the patient standing and lying down must be taken. No enema should be given prior to plain X-ray because it may cause false fluid levels. The sensitivity is from 70 to 80% for small bowel obstruction.

The finding in erect abdomen X-ray for small bowel obstruction are dilated small bowel loops (>3 cm in diameter), multiple air fluid level on erect films and paucity of air in the colon.

Gas shadows:

When the jejunum, ileum or the colon is distended with gas, each structure has significant radiological pictures. Jejunum has a characteristic 'valvulae conniventes' from anti-mesenteric to mesenteric border in the regular fashion. Ileum radiography was described by Wangensteen as being 'characterless'. Large intestine has haustral markings which are spaced irregularly, do not encircle the complete circumference of the bowel and gas shadows of large intestine are located peripherally.

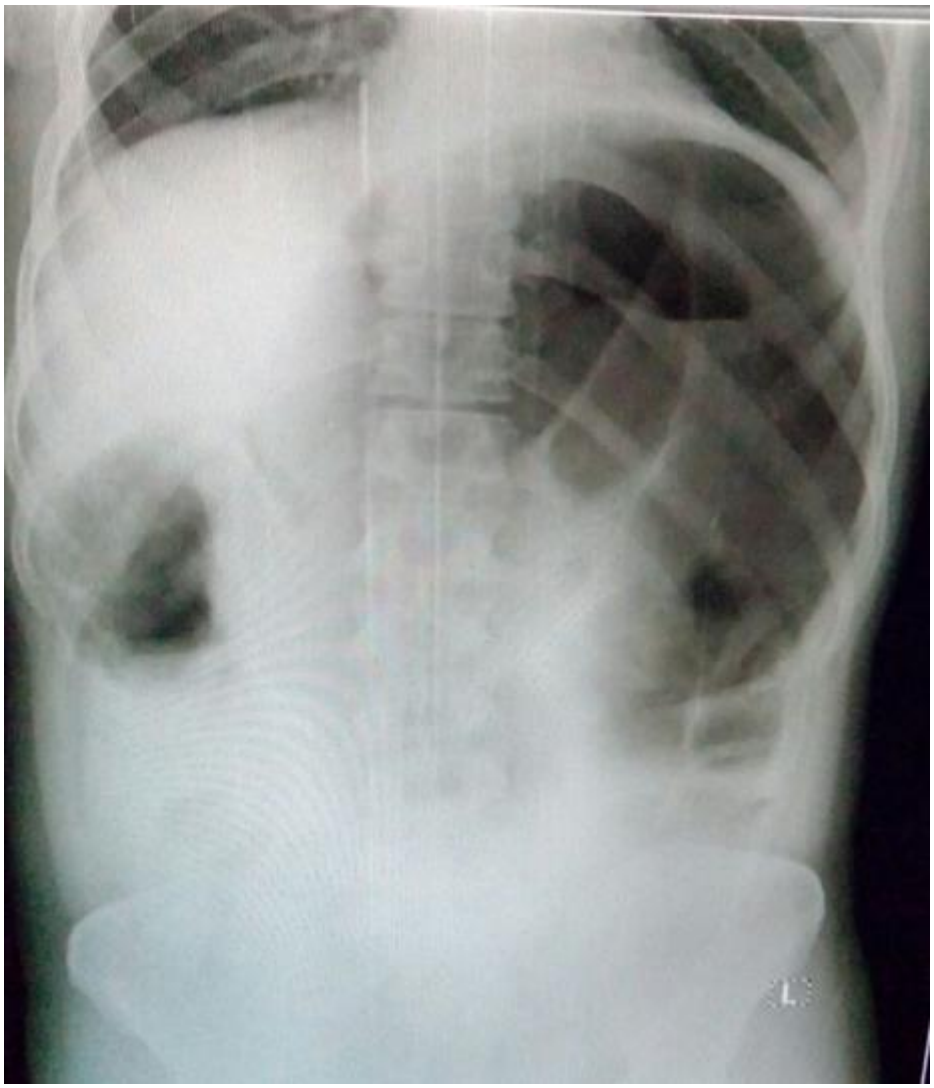
Fluid levels:

There are two inconstant fluid levels which are considered as physiological, at the duodenal cap and the other in the terminal part of ileum.

In proximal bowel obstruction, fluid levels will be in left upper quadrant and there will be few in number, multiple fluid level seen all over the abdomen in case of low small bowel obstruction. The presence of gas in the wall of the bowel is a highly significant sign of intestinal necrosis, which was demonstrated by Schorr in 1963.

MULTIPLE AIR FLUID LEVEL

Volvulus of sigmoid shows greatly distended sigmoid loop filling the whole of the abdomen upto the diaphragm with the “Bent inner tube sign”. Millin and Righler pointed out that “coffee bean” sign in pathognomonic sign of caecal volvulus.



(a) Crohn’s disease: String sign – narrow and smooth terminal part of ileum is seen.

(b) Hyperplastic ileocaecal tuberculosis: A long narrow constricted terminal ileum and ascending colon with caecum can be seen.

Barium enema:

In intussusception, barium is seen as a ‘claw’ in intussusception whereas in sigmoid volvulus, barium column ends at the level of the distal sigmoid torsion in a characteristic Twisted Bird’s Beak deformity.

Computerized tomography (CT)

CT demonstrates the cause of obstruction. Computerized tomography is very much useful for determining the site, level and cause of obstruction and bowel viability.

CT is most valuable when there are systemic signs suggestive of infarction, an associated palpable mass. In these cases CT may confirm the presumptive diagnosis or reveal other causes such as appendicitis or diverticulitis.

It is a investigation of choice in patients with history of abdominal malignancy and presenting as bowel obstruction. In strangulated obstruction, target sign or pneumatosis and haemorrhage in the mesentery can be seen.

TREATMENT OF ACUTE INTESTINAL OBSTRUCTION

The treatment has to be planned accordingly to the above assessment which includes supportive management and surgical management. There are four main measures in management of obstruction.

• GI decompression

• Fluid and electrolyte replacement

• Obstruction relief by surgery

• Antibiotics

The initial two steps are mandatory prior to surgery. Surgical treatment can be delayed till resuscitation is complete and there are no signs of strangulation, closed loop obstruction.

GI decompression

GI decompression is achieved by the passage of non-vented (Ryle's tube) or vented tube. The tube is placed as continuous drainage with hourly aspiration. Decompression of the bowel proximal to the obstruction and decompression of

stomach will relieve certain amount of distension and toxic fluid accumulated in the bowel.

Also avoids the aspiration pneumonia during induction of anaesthesia. It is also improves local bowel circulation and venous return to the heart by relieving the pressure over the IVC. There are other special tubes used in decompression of the small bowel (long intestinal tube).

Fluid and electrolyte replacement

Underlying cause of obstruction has to be individualized in every patient. This should be routine in all cases of bowel obstruction before taking up for surgical intervention except in few case of early simple obstruction, which is within 24 hours. The longer the duration of obstruction longer will be the time taken to get the patient ready for surgery. It is best to intervene when vital signs show a return to normal.

The parameters like pulse rate, BP, Shock state, Degree of dehydration, Urine Output, Initial haematocrit value are taken into consideration in fluid management.

Electrolytes

The fluid loss should be corrected by colloidal replacement such as blood plasma, in most cases hyper or hypo natraemia which can be corrected by replacement of Hartman's solution or normal saline. The sodium deficit is estimated by multiplying the decrease in sodium concentration between the normal with total

body water in liters. The composition of Ringer's lactate is almost as that of plasma and considered as physiologic and can be used to replace ECF and GI losses, in the absence of gross abnormalities of concentration and composition, if gastric juice loss is prominent, normal saline is used.

The sodium chloride required on an average 80-110 μ mols and is provided by 570 ml of isotonic saline solution. The KCI necessary for replacement should not be given until the normal renal output is established. Acid base balance is corrected depending upon their determination. All patients with intestinal obstruction should have a central venous catheter in situ in superior vena cava, for frequent measurement of CVP and indwelling catheter into the bladder for measurement of urine output.

Antibiotics

Use of broad-spectrum antibiotics in adequate doses along with metronidazole are advised. It is important to give antibiotics pre and postoperatively till adequate recovery takes place.

Surgical Management

With regard to the timing of surgery, all patients should be operated on promptly after volume resuscitation if any evidence or suspicion arises that bowel

is ischaemic. Early operation indicated in (1) obstructed and strangulated hernia, (2) internal intestinal strangulation (3) acute obstruction.

Laparotomy

When the cause of obstruction lies within the abdomen and but its site is doubtful, midline or right paramedian incision is advised, if left sided colonic obstruction is defined left mid or lower paramedian incision preferred, abdominal cavity is inspected which indicates the underlying pathology. Haemorrhagic fluid denotes strangulation; clear straw-coloured fluid denotes simple obstruction. The intra operative assessment is focussed on:

• Site of obstruction

• Viability of the gut

• Cause of obstruction

Principles of large bowel obstruction

As most of the large bowel obstruction are due to malignancy, volvulus or secondary to adhesive bands, which commonly occur, in elderly patient. Operable

lesions in the caecum, ascending colon or proximal transverse colon right hemicolectomy is performed. For Inoperable lesions a proximal stoma (colostomy or ileostomy) or an ileo transverse colon bypass is done. For lesions in the splenic flexure extended right hemicolectomy is done.

If one stage resection anastomosis is not feasible a covering colostomy to protect the site of anastomosis is safe, where the distal segment could not be brought to the surface a proximal stoma and the distal end closed and returned to abdomen (Hartman's procedure) or both the ends brought outside, proximal as stoma and distal as mucus fistula, then a colorectal anastomosis can be done.

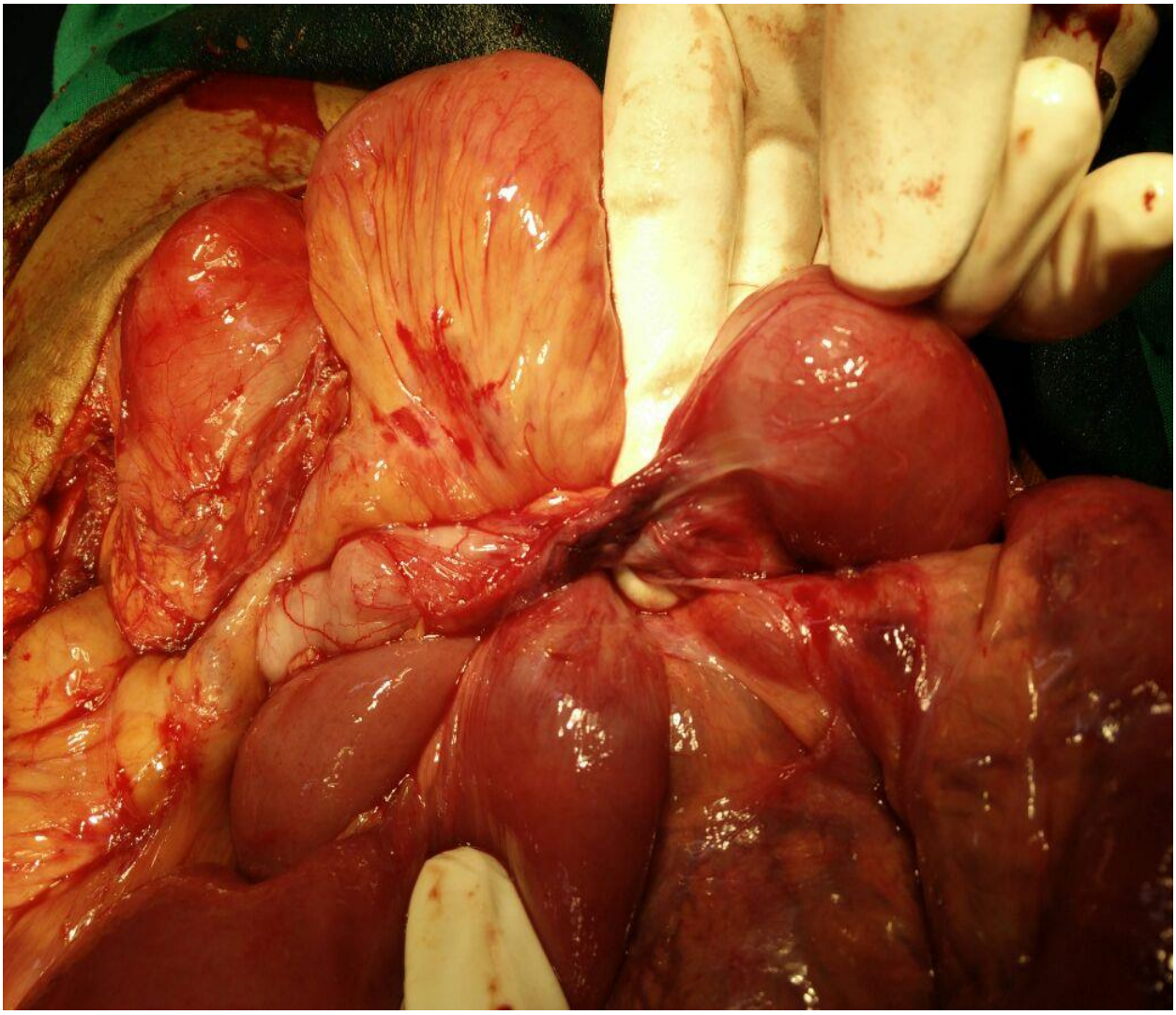
In very old patients when an obstructing carcinoma of rectum is fixed, colostomy is done.

INTESTINAL OBSTRUCTION BY ADHESIONS AND BAND

Post operative adhesions is the most common cause of acute intestinal obstruction in developing countries. The pathology lies with peritoneal irritation which produces fibrin rich exudates. The fibrinous adhesions may become vascularised and become mature fibrous tissue. Infection being an important cause. Also foreign materials like silk thread, barium sulphate, talc, results in fibrous formation.

These commonly occurs following laparotomy surgeries. Once adhesions have developed, progression to obstruction is inevitable in a significant proportion. Ileum is the commonest segment to be obstructed due to adhesions.

ADHESION BAND CAUSING OBSTRUCTION



Prevention of adhesion

The postoperative adhesions can be prevented by

• A good surgical technique.

• Minimal contact with gauze.

• Washing the peritoneal cavity with saline.

• Covering the anastamotic and raw peritoneal surface with omentum.

• Substances such as hyaluroinidase, hydrocortisone, silicon, dextron, polylyvinyl propylene (PVP) chondritin, streptopyris, anticoagulants, antihistamine, NSAIDs, streptokinase can be instilled in the peritoneal cavity to prevent the formation of adhesion. But no single agent found to be safe and effective.

Internal hernias

A condition where a segment of the small intestine herniates into retroperitoneal fossae. This can occur in following sites:

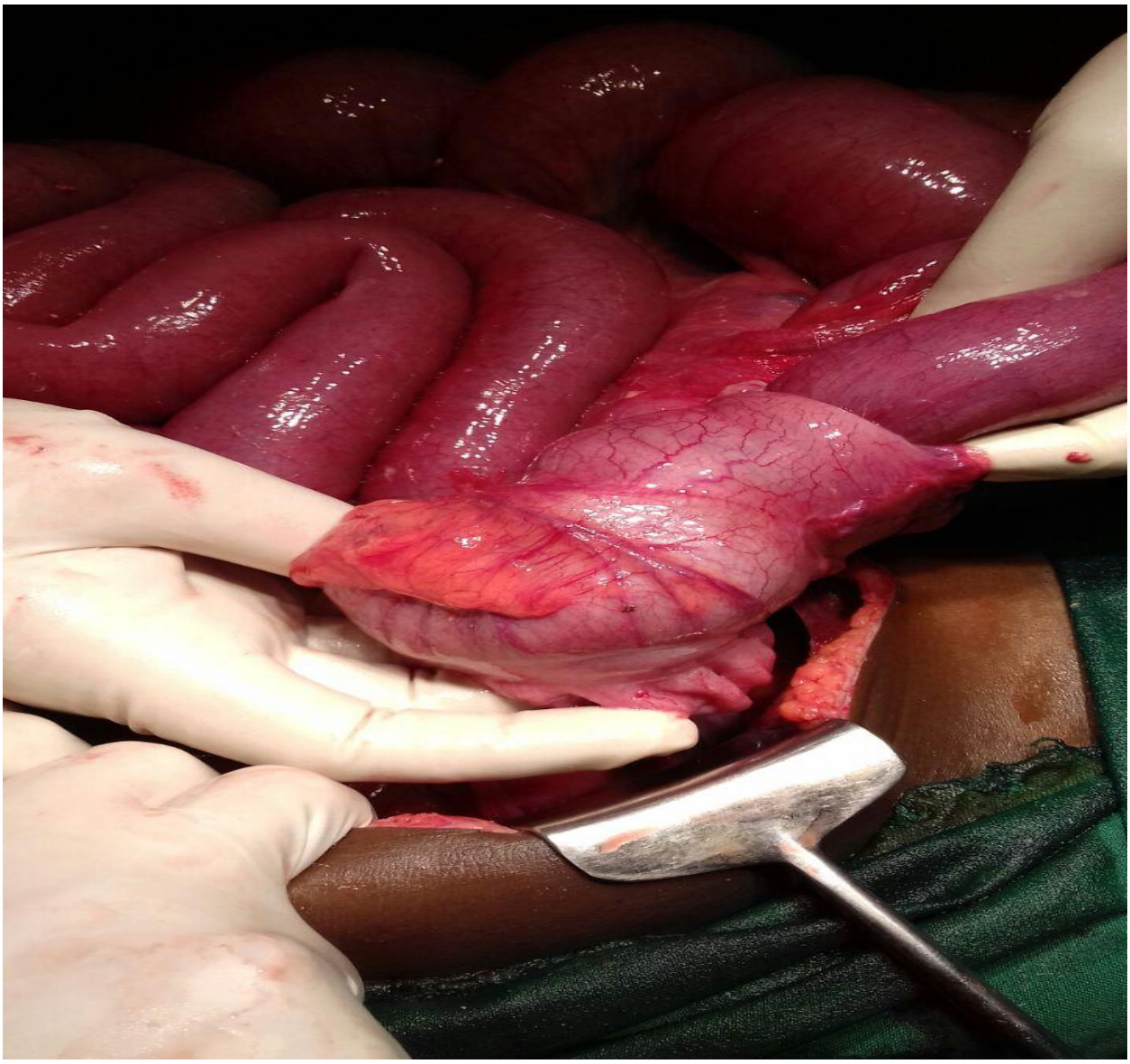
• Supravesical hernia

• Foramen of Winslow

• Diaphragmatic hernia: Acquired/Congenital.

• Caecal: Retroperitoneal fossae superior or retrocaecal.

A rent in the mesentery or the mesocolon.



INTUSSUSCEPTION

When one part of the gut invaginates into the immediately adjacent loop, the condition is called as intussusception. Most of the time, it is the proximal segment of bowel that invaginates into the distal segment. It is one of the commonest cause in paediatric age group. It can also occur in adults. In adults, our 2/3rd rule may be applied. Two-thirds of adult intussusceptions are from known causes. Of these two-thirds are due to neoplasms. Of these neoplasms, two-thirds will be malignant

An intussusception constitutes following parts: Intussusceptum ,Intussuscepiens, Apex. The types of intussusception are as follows: Ileocolic (77%), Ileo-ileocolic (12%), Ileo-ileal (5%),Colo-colic (2%) Multiple (1%).

INTUSSUSCEPTION

VOLVULUS

Volvulus is axial rotation of the bowel around its mesentery. This can be primary or secondary. Primary volvulus occurs due to malrotation of the gut, abnormal mesenteric attachments or congenital bands. E.g.Caecal volvulus, volvulus

neonatorum and sigmoid volvulus. A secondary volvulus is due to actual rotation of a segment of bowel around an acquired adhesion or stoma.

SIGMOID VOLVULUS

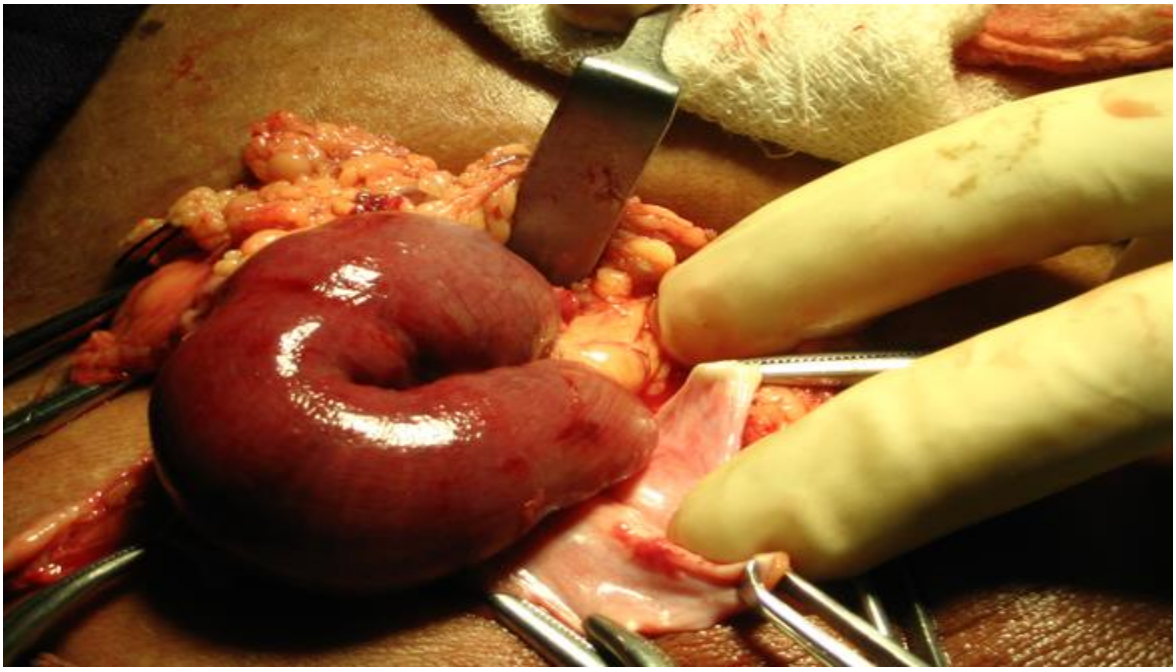
SIMPLE VERSUS STRANGULATING OBSTRUCTION

Obstructed external hernia is the second most common cause. Most of the patients with small bowel obstruction have a simple obstructions that involve only a mechanical blockage to the flow of luminal contents. There is no compromise of the blood supply and viability. In strangulating obstruction there is obstruction with compromised blood flow.

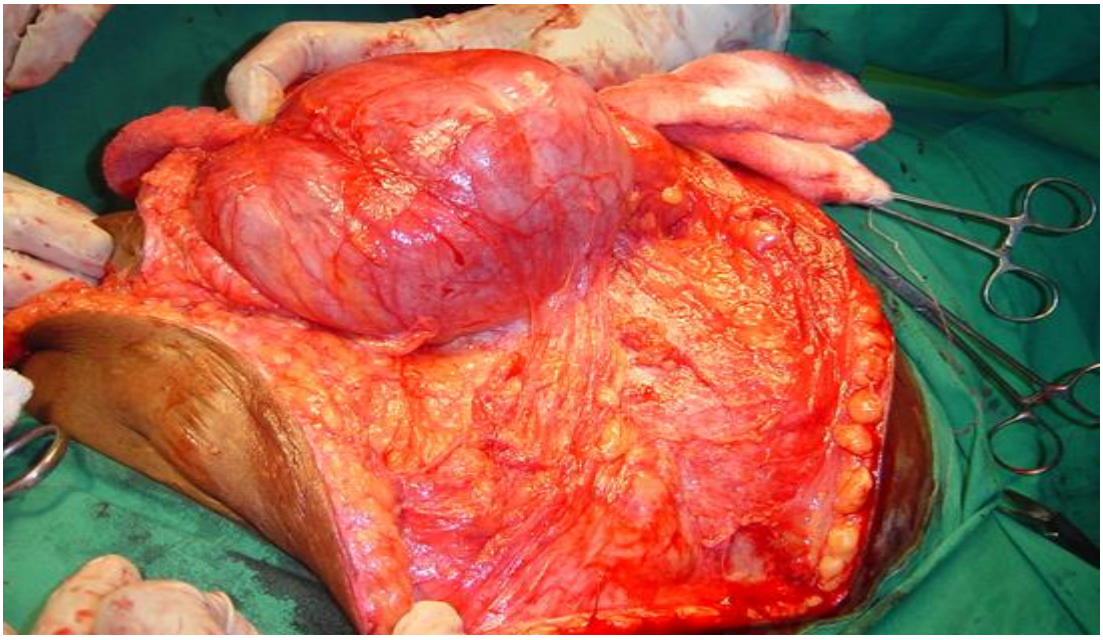
Strangulating obstruction caused by incarceration of inguinal, femoral, epigastric, paraumbilical hernia can cause bowel obstruction by a closed-loop obstruction. The vascular supply to a segment of intestine is compromised leading to intestinal infarction. Classical signs of strangulation are tachycardia, fever, leukocytosis, constant noncramping abdominal pain.

OBSTRUCTED INGUINAL HERNIA

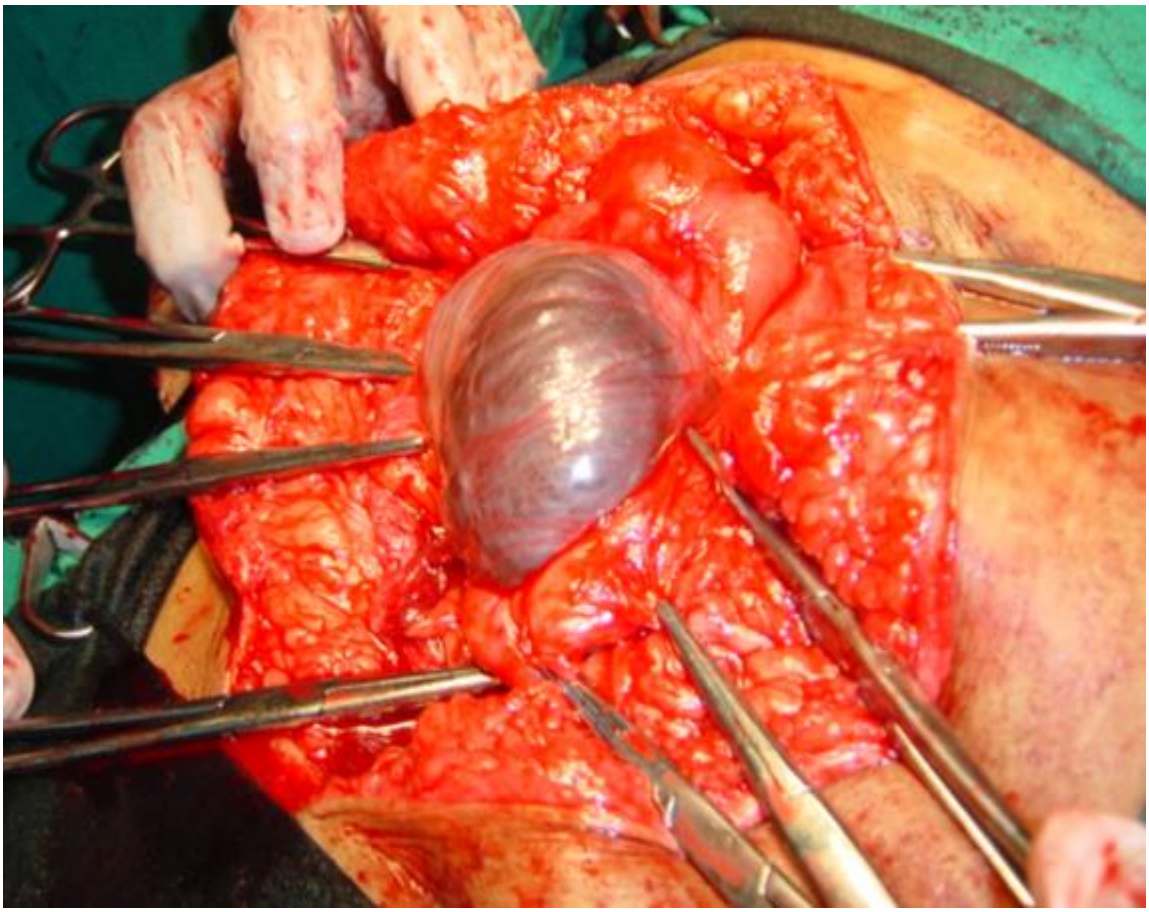
OBSTRUCTED FEMORAL HERNIA



OBSTRUCTED PARAUMBILICAL HERNIA



OBSTRUCTED INCISIONAL HERNIA



TUBERCULOSIS OF INTESTINE

Intestinal obstruction is the most common complication in the small bowel, affecting 60% of the patients with tuberculous enteritis. Common site is ileum, proximal colon and peritoneum. Approximately, 75% of patients with tuberculosis enteritis have involvement of the distal small bowel and ileocaecal region. There are two types:

1. Hyperplastic tuberculosis

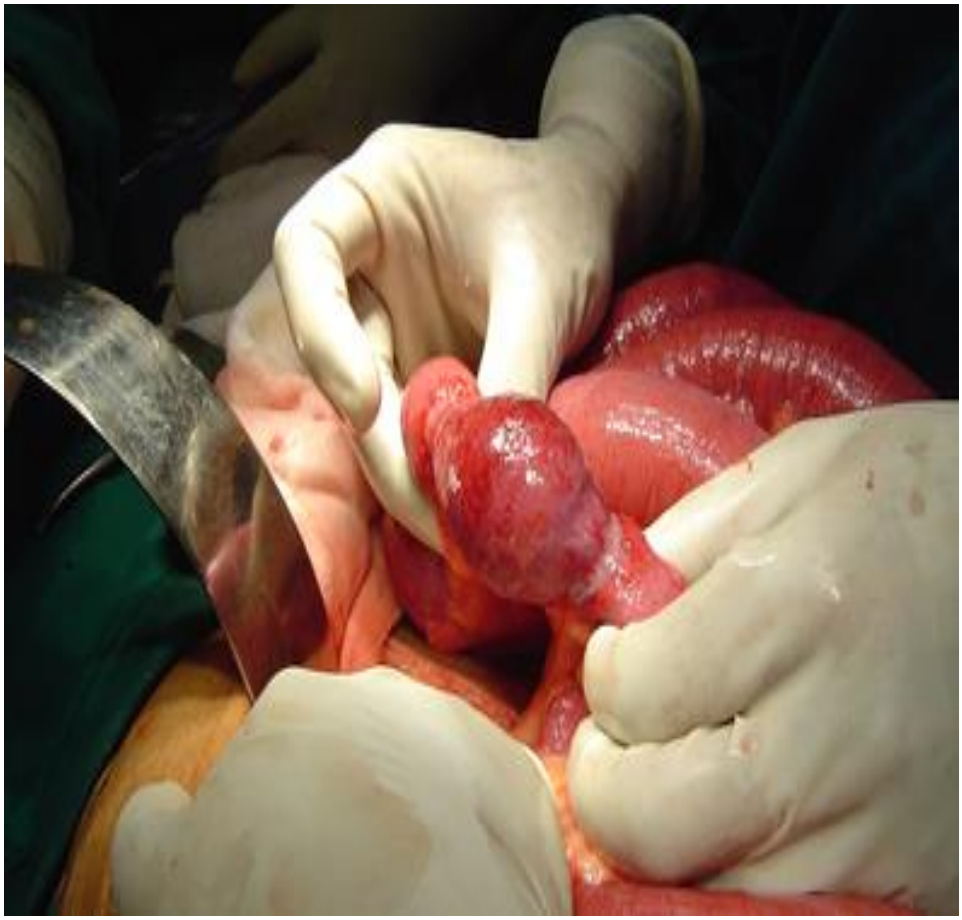
The bacilli lodges in the lymphoid follicles and causes chronic inflammation resulting in thickening and narrowing of the lumen. Pain abdomen with intermittent diarrhea, mass in RIF are usual symptoms. In non-obstructed patients, treatment is antituberculosis drugs and in patients with intestinal obstruction the presentation will be subacute intestinal obstruction which should be managed by resection of ileocaecal segment. When the patient presents with acute intestinal obstruction is treated with ileotransverse anastomosis.

2. Ulcerative tuberculosis

In this condition multiple ulcers are found in the terminal part of ileum with serosal thickening and reddening. These patients are treated with antitubercular

treatment, presents with intestinal obstruction secondary to stricture. There are treated by stricturoplasty or by resection of segment of bowel which contains multiple stricture or long segment stricture.

STRICTURE- SMALL BOWEL



Other forms of strictures

Crohn's disease is one of the common aetiology of Stricture of small intestine. Carcinoma, carcinoid, lymphoma can also cause stricture. Resection is the treatment whenever technically feasible.

GALL STONE ILEUS

Gall stone ileus accounts for 1-2% of cases. It occurs in older age group. To cause a mechanical obstruction gall stone should be larger than 2.5 cm and must enter the GIT by ulceration. The stone passes through duodenum, jejunum and colon. Obstruction is caused at distal part of ileum or at any other area of narrowing. Treatment is removal of stone through a enterotomy or resection.

NEOPLASMS

Extrinsic tumour involvement from secondary spread is more likely causes of obstruction. Bowel obstruction from metastatic disease arises when the loop of intestine gets trapped within the malignant masses. Carcinoma of ovary, colon, stomach and pancreas are the most common causes of this type of obstruction.

Primary tumours of small bowel can cause intestinal obstruction either by obstructing the lumen or by acting as nidus for intussusception. Although benign tumours are predisposing conditions for intussusception, malignant tumours

like adenocarcinoma lymphomas and carcinoids rarely give rise to obstruction, wide resection and end-to-end anastamosis is the treatment.

Foreign bodies and bezoars

Luminal obstruction by the ingestion of foreign body commonly in children and psychotic patients. Bezoar may migrate into the small intestine causing obstruction. Small bowel obstruction can occur from bezoar arising from intestinal diverticulum. Bezoar or foreign body get impacted at the site where bowel is narrowed by previous surgery. Treatment is removal of foreign body or bezoar by enterotomy.

LARGE BOWEL OBSTRUCTION

Colorectal malignancy is the most common cause of large bowel Obstruction. Intraluminal causes are fecal impaction, inspissated barium, and foreign body. Intramural causes are inflammation (diverticulitis, Crohn's disease, lymphogranuloma venereum, tuberculosis, and schistosomiasis), Hirschsprung's disease (aganglionosis), ischemia, radiation, intussusception, and anastomotic stricture. Extraluminal causes are adhesions, hernias, tumor of adjacent organs and volvulus.

Carcinoma of the colon

Malignancy is the most frequent etiology of large-bowel obstruction. The left colon is the most likely site of obstruction and the extraperitoneal rectum the least. Signs of partial obstruction progress to those of complete obstruction when the narrowed colonic lumen is occluded by a fecal bolus. Since the right colon has semiliquid contents and a relatively wide lumen, obstruction occurs late in this segment and may be acute in its presentation, especially if the ileocecal valve is competent. The operative risk is increased considerably when perforation is present.

The sigmoid colon is the usual site: this portion of the intestine is thick walled, not particularly distensible, and comparatively narrow. Obstructing lesions in the caecum and the ascending colon should be resected via right hemicolectomy, usually with a primary anastomosis. Lesions in the transverse colon should be managed with an extended right hemicolectomy and again, with a primary anastomosis. Proximal diversion with an end ileostomy is not necessary in all patients; however, proximal diversion should be considered when there is any concern about bowel viability, if the patient is unstable, or in the case of substantial peritoneal contamination or peritonitis.

The management of obstructing lesions in the descending and sigmoid colon is a more classic approach with a Hartmann's procedure of segmental resection of the affected colon, an end colostomy, and a blind distal pouch or mucous fistula. An

end colostomy at the time of operation is safe and may decrease the incidence of perioperative complications compared to an on-the-table bowel preparation with primary anastomosis.

Another option to consider in the early management of the patient with an obstructing lesion in the large bowel is the self-expanding intraluminal metal stent (SEMS) to allow immediate colonic decompression and the ability to perform elective mechanical bowel preparation.

Mesenteric Vascular Occlusion

Embolism from vessel is more common than spontaneous thrombosis. The superior mesenteric vessels are more commonly involved. Other Possible sources of emboli include atrial fibrillation, a mural myocardial infarct, an atheromatous plaque or aneurysm, a vegetation of mitral valve, pulmonary vein thrombosis.

Acute mesenteric ischaemia is a highly morbid events with reported mortality rates exceeding 60%. When the main branch of superior mesenteric artery is occluded, the whole of small intestine, caecum and a part of the ascending colon become infarcted.

The **Clinical features are**

(i) Abdominal Pain which is central in nature.

(ii) Gastrointestinal emptying with persistent vomiting. Mesenteric angiography is a definitive diagnostic study. Duplex ultrasonography may be of some benefit in visualizing flow in the SMA.

MATERIAL AND METHODOLOGY:

This study was conducted at Government Tirunelveli medical college and hospital for a period of two years from June 2014 to June 2016. It is a descriptive study that included 100 patients who were diagnosed to have Acute Intestinal Obstruction based on clinical, biochemical and radiological features. The patients who are managed conservatively without surgical intervention are excluded. Other investigations for fitness for anaesthesia are taken.

Final diagnosis is made at exploratory laparotomy. Cause of obstruction, site of obstruction and the operative procedure done are recorded. Biopsy is taken where required for histopathological confirmation. Postoperative complications, outcome and mortality are noted.

The details of the patients name, age, sex, IP no., symptoms at presentation, investigations, intra-operative findings and other outcome were recorded. The observations were tabulated and compared with recent literature and final conclusions derived.

INCLUSION CRITERIA:

- All patients presenting to emergency department with features of intestinal obstruction and are treated surgically.
- Patients in the age group 15 to 80 years.
- Patients who are haemodynamically stable.

EXCLUSION CRITERIA:

• Patients presenting with subacute intestinal obstruction.

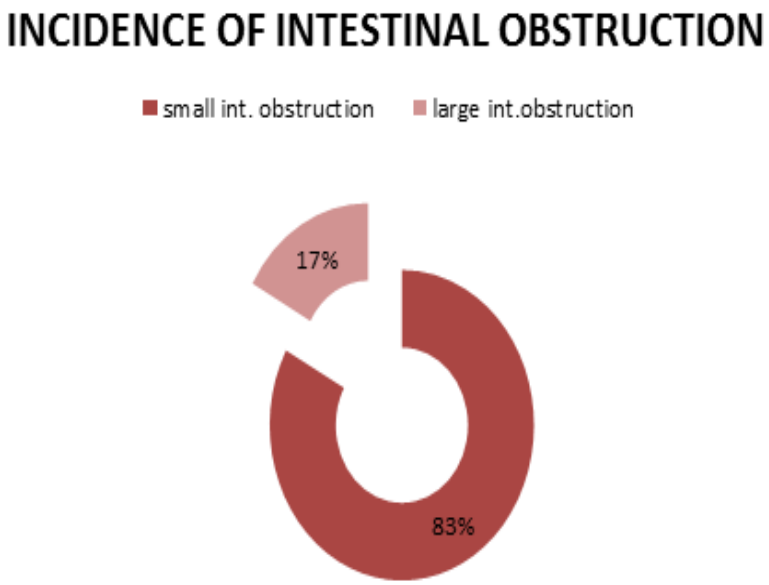
• Paediatric age group patients.

OBSERVATIONS

Total number of patients admitted with Acute Intestinal Obstruction from June 2014 to June 2016- 100 cases.

Large intestine obstruction – 17

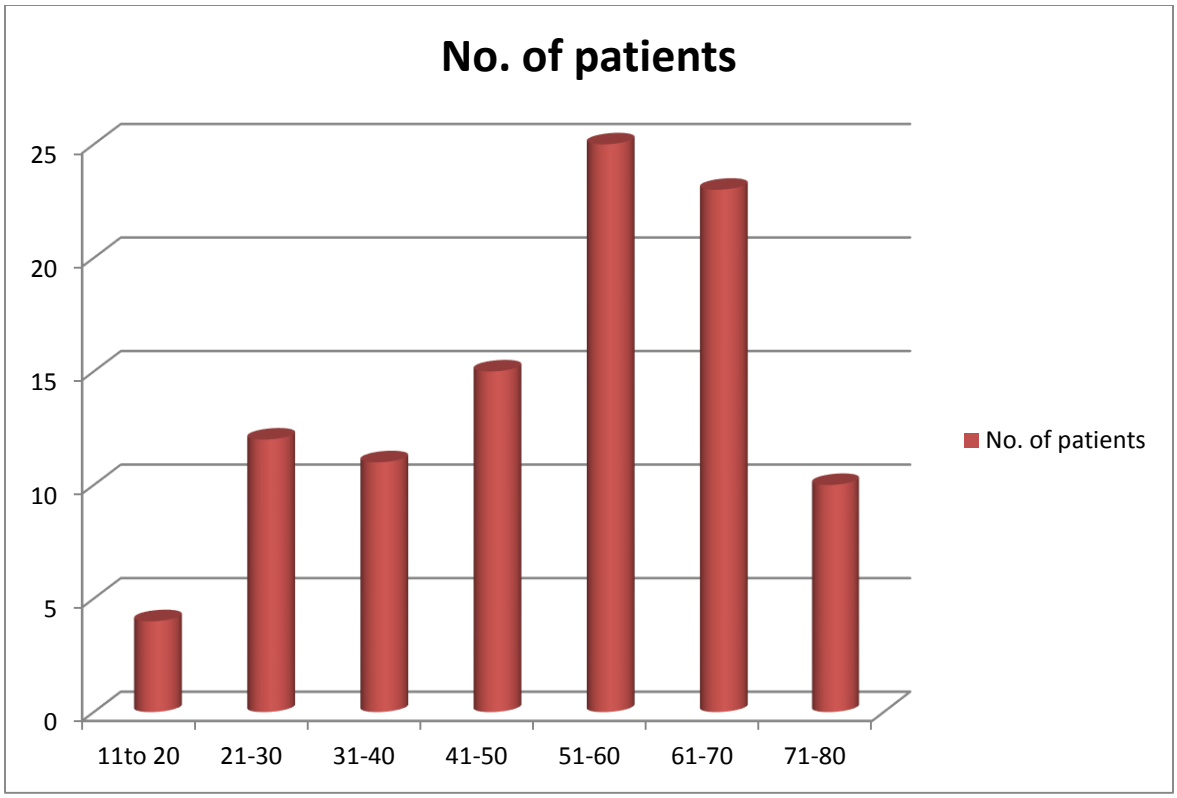
Small intestine obstruction – 83



AGE DISTRIBUTION

S.NO	Age in years	No. of patients
1	11-20	4
2	21-30	12
3	31-40	11
4	41-50	15
5	51-60	25
6	61-70	23
7	71-80	10

AGE DISTRIBUTION



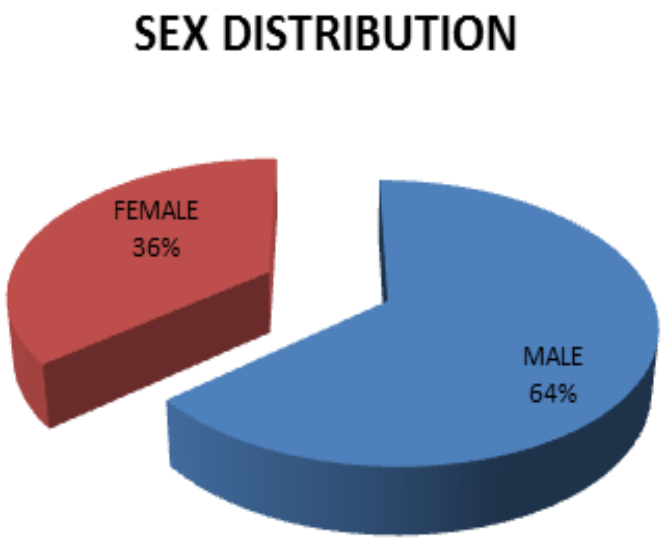
Most common age group affected was between 51 to 60 years.

SEX DISTRIBUTION

Males- 64 cases

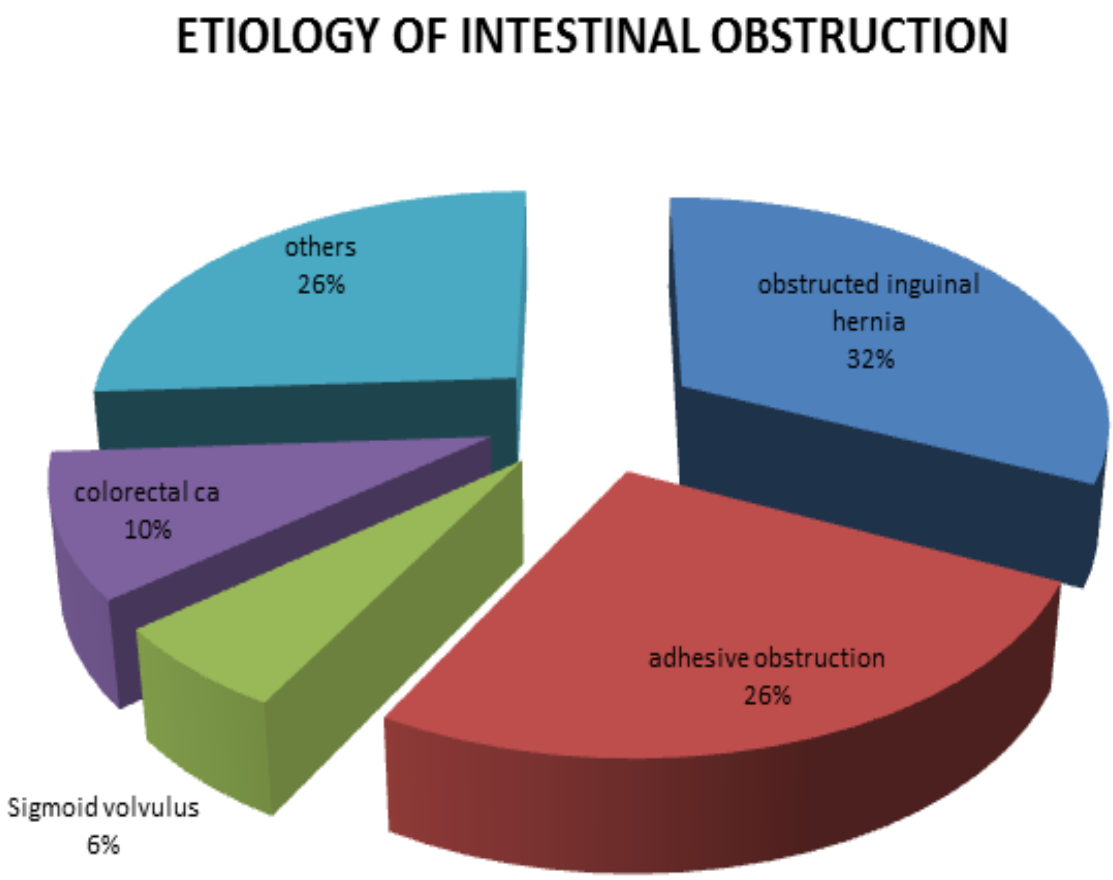
Females -36 cases

Males are affected 1.7 times that of females.



ETIOLOGY

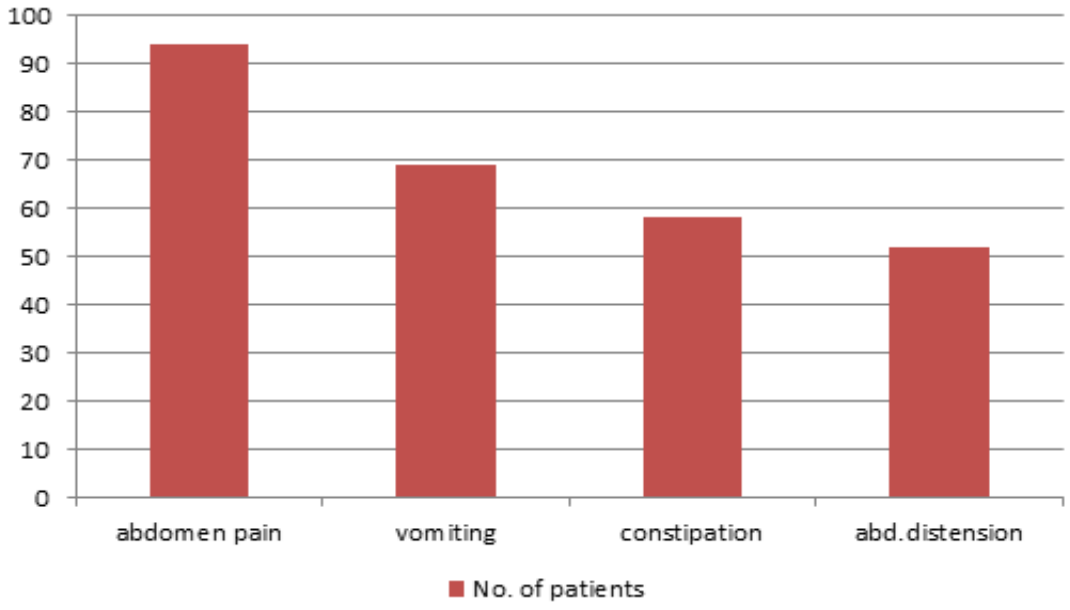
S.NO	ETIOLOGY	NO. OF CASES
1	obstructed inguinal hernia	32
2	adhesive obstruction	26
3	ileocaecal Tb	3
4	umbilical/paraumbilical hernia	8
5	incisional hernia	9
6	femoral hernia	1
7	intussusception	1
8	Ascending & descending colon growth	2
9	sigmoid colon growth	4
10	rectum/ anal canal growth	5
11	sigmoid volvulus	6
12	SMA syndrome	2
13	internal hernia	1



Obstructed inguinal hernia was found to be the most common cause followed by adhesive obstruction.

CLINICAL FEATURES

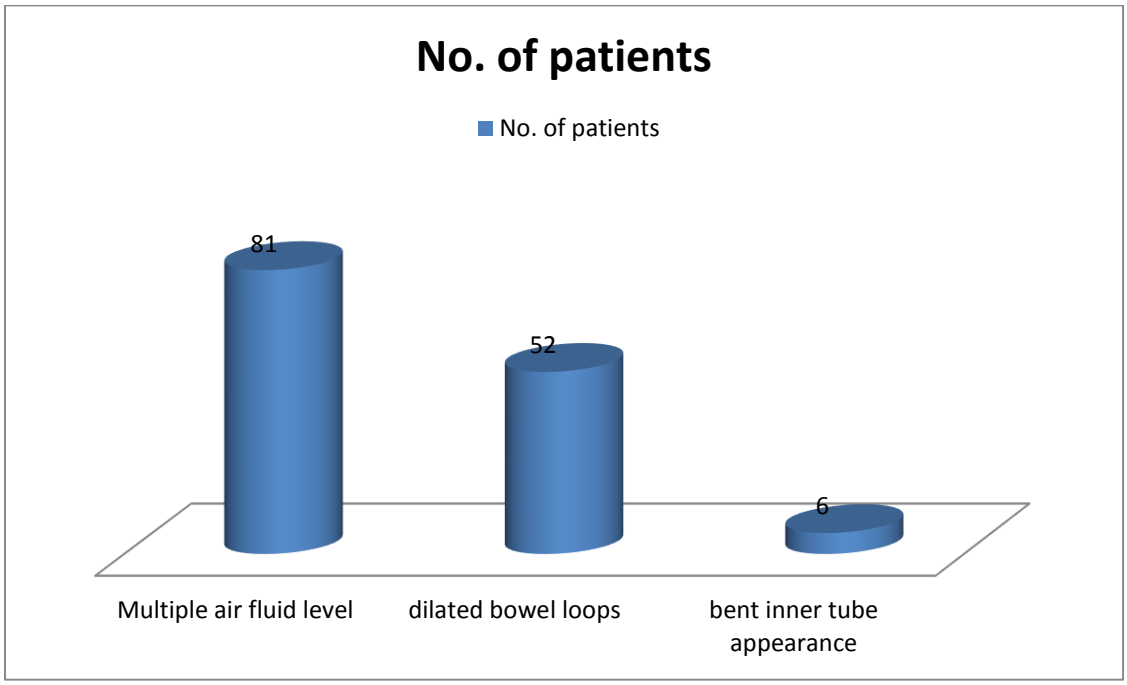
S.NO	Clinical features	No. of patients
1.	abdomen pain	94
2.	vomiting	69
3.	constipation	58
4.	abd.distension	52



RADIOLOGICAL FINDINGS

S.NO	X-ray findings	No. of patients
1	Multiple air fluid level	81
2	dilated bowel loops	52
3	Bent inner tube appearance	6

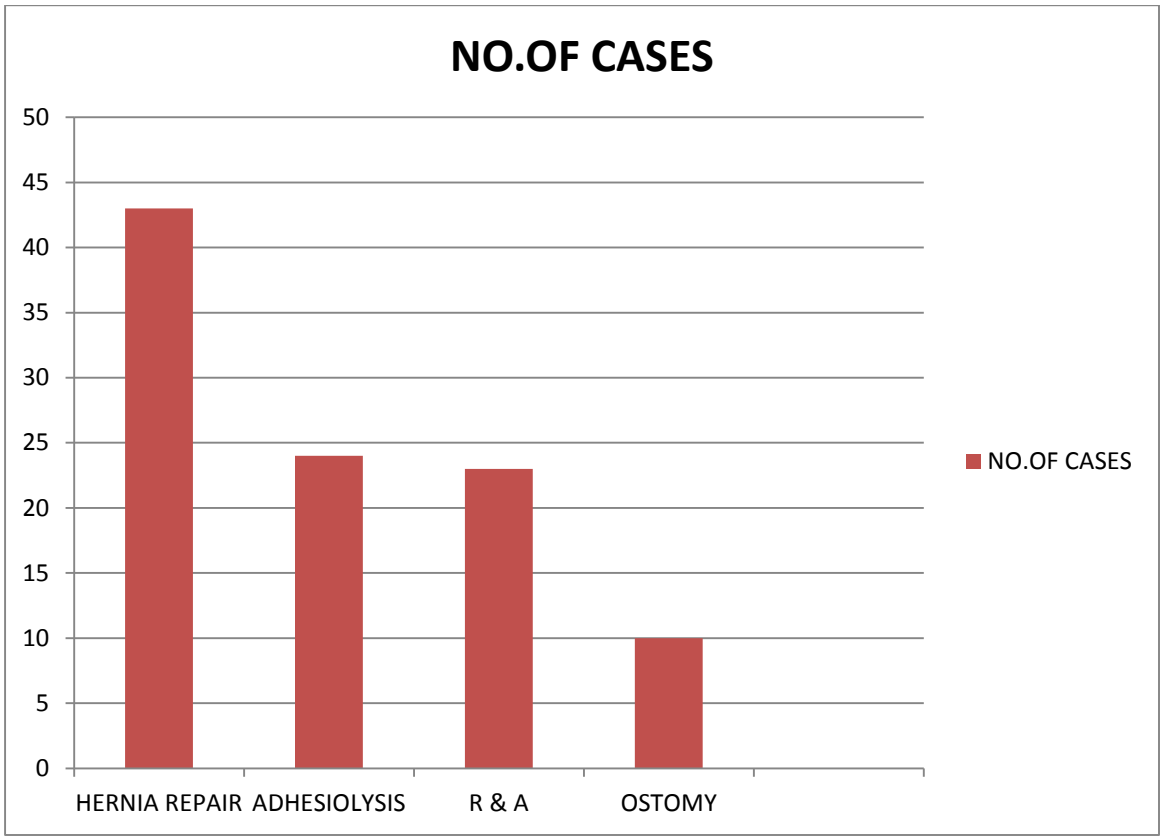
RADIOLOGICAL FINDINGS



SURGICAL TREATMENT

S.NO	PROCEDURE	**NO.OF CASES**
1	HERNIA REPAIR	43
2	ADHESIOLYSIS	24
3	RESECTION AND ANASTAMOSIS	23
4	OSTOMY	10

SURGICAL TREATMENT



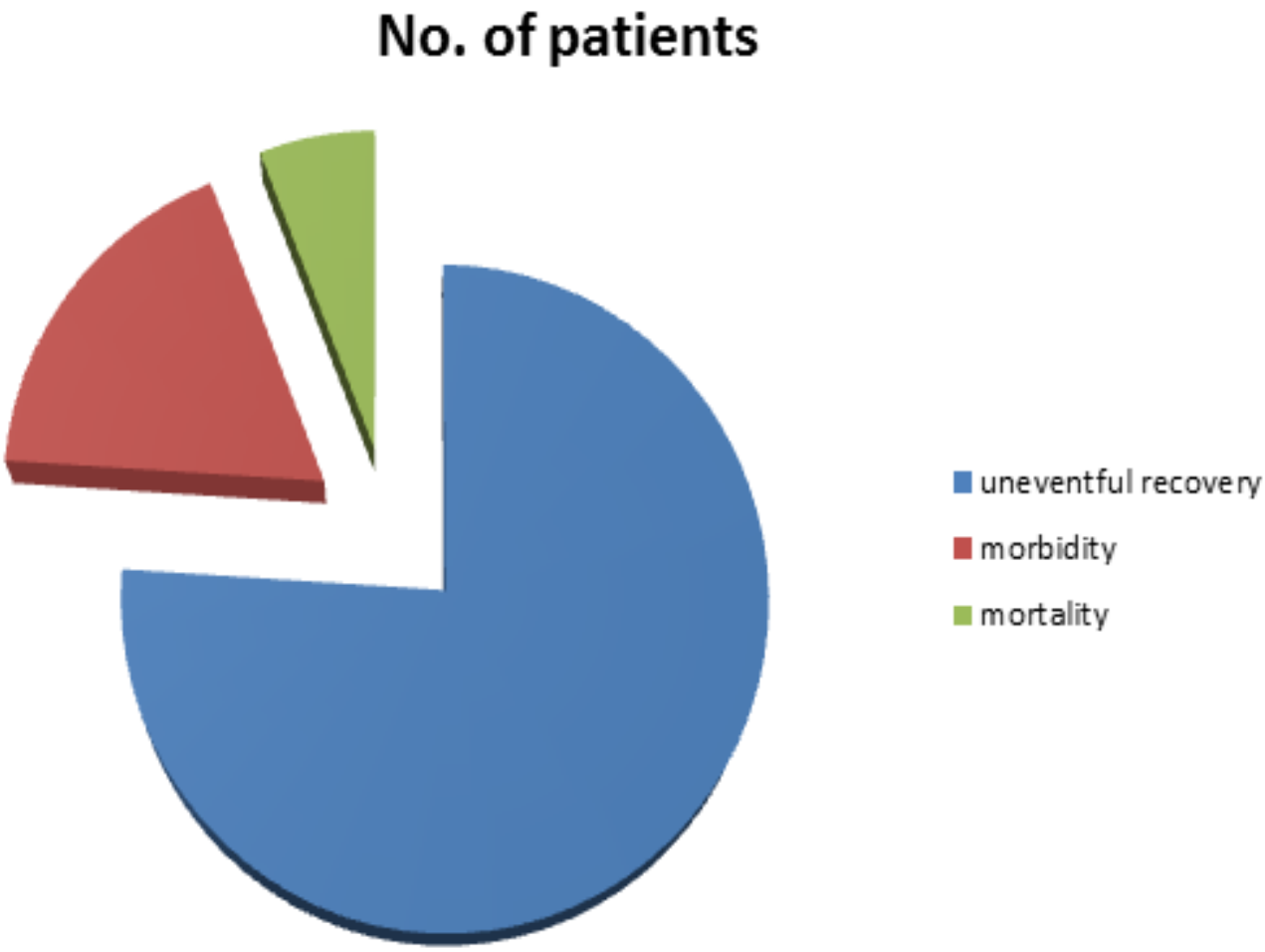
OUTCOME

In most of the patients postoperative period was uneventful. The outcomes are tabulated as below.

S.NO	outcome	No. of patients
1	uneventful recovery	76
2	morbidity	18
3	mortality	6

Morbidity include Wound infection (10 cases), Enterocutaneous Fistula(6 cases) and Prolonged ileus(2 cases).

OUTCOME



In the present study 6 persons died during postoperative period. The analysis of cause of death is shown below.

S.No	Age and sex	Operative findings	Operative procedure	Post operative day	Cause of death
1	75/F(case no.5)	Rectal growth	Colostomy	POD 1	shock
2	56/M(case no.13)	Internal hernia	Resection and anastamosis	POD 3	Septicemia
3	72/F (case no.20)	Sigmoid volvulus	Resection and anastamosis	POD 5	Septicemia
4	65/F(case no.28)	Adhesive obstruction	Resection and anastamosis	POD 5	Septicemia
5	70/M(case no.48)	Descending colon growth	Colostomy	POD 1	shock

6	70/M(case no.92)	CA Ascending colon with liver secondaries	Ileocolic anastamosis	POD 4	septice mia

DISCUSSION

In this study conducted for 2 years from June 2014- June 2016 in Government Tirunelveli medical college about 100 patients with intestinal obstruction were studied and various data collected from the study are discussed below.

SITE OF OBSTRUCTION:

Of the 100 cases, 83 were due to small bowel obstruction and 17 were due to large bowel obstruction. Hence small bowel was frequently involved than the large bowel.

AGE DISTRIBUTION:

Most common age group affected was between 51-60years (25 patients) followed by 61-70years(23 patients). The mean age incidence is 55.5years. It is comparable with the study conducted by Souvik Adhikari and colleagues in 2010.

Age group	Cole GJ	Souvik Adhikari	Harban Singh	Present study
12-20	8%	9%	10%	4
21-30	10%	11%	16%	12
31-40	16%	15%	18%	11
41-50	16%	13%	15%	15
51-60	20%	24%	14%	25
61-70	18%	22%	20%	23
71-80	12%	10%	5%	10

SEX DISTRIBUTION:

Of the 100 patients with acute intestinal obstruction 64% were males and 36% were females which is consistent with sex incidence of similar studies conducted by Miller and colleagues and many other similar studies.

ETIOLOGY:

Among the 100 cases, most common cause of acute intestinal obstruction was found to be obstructed/strangulated inguinal hernia which accounted for 32% of cases. Second most common cause was found to be adhesions which accounted for 26% of cases.

Obstructed incisional and umbilical/paraumbilical hernia contributes 9% and 8% of total cases respectively. Similar results have been noted in a study conducted by Adhikari Souvik and colleagues in Eastern India in 2010.

Cause	Souvik Adhikari	Jahangir	Arshad M.Malik	Cole GJ	Brooks and Buttler	Playforth 1970	Present study
Adhesions	16%	49%	41%	10%	23%	54%	26%
Hernia	36%	34%	19%	35%	25%	23%	32%
Volvulus	6%	5%	4%	3%	1%	3%	6%
Tuberculosis	14%	1%	24%	3%	-	-	3%
Malignancy	17%	3%	2%	9%	5%	9%	11%
Intussusception	2%	6%	-	12%	18%	5%	1%
Miscellaneous	9%	2%	10%	-	-	6%	22%

Although post-operative adhesions were found to be the most common cause of obstruction worldwide, in our study inguinal hernias account for most of the cases.

CLINICAL FEATURES:

Most of the cases presented with abdominal pain(94%), followed by vomiting(69%), constipation(58%) and abdominal distension(52%).

Study group	Pain abdomen	Vomiting	Distension	Constipation
Jahangir-Sarwar khan	100	92	97	97
Souvik Adhikari	72	91	93	82
Present study	94	69	58	52

RADIOLOGICAL FINDINGS:

Most common radiological finding was multiple air fluid levels seen in plain X-ray abdomen erect view. This finding was seen in 81 patients followed by dilated bowel loops seen in 52 patients and bent inner tube appearance in 6 patients. The observations are comparable to a similar study conducted by Arshad M.Malik and colleagues in 2010.

SURGICAL PROCEDURE:

Most common surgical procedure was hernia reduction and repair which included inguinal, femoral, incisional and paraumblical hernia repairs. Next common procedure was adhesiolysis followed by resection and anastomosis / colostomy.

OUTCOMES:

Most of the cases recovered without any complications(76%). Infection was the major case of morbidity and was seen in 18% of patients. Mortality was 6% and was commonly seen in patients with strangulation and increased age. Of 6 deaths 4 were due to sepsis and remaining 2 were due to aspiration. This observation is comparable to a similar study conducted by Adhikari Souvik and colleagues.

Studies	Year	No. of cases studied	Mortality
Present study	2016	100	6%
Souvik Adhikari	2010	367	7.35%
Safian Matsu Moto	1975	171	19%
Jahangir-Sarwar Khan	2001	100	7%
Ramachandran CS	1982	417	12.7%

CONCLUSION

This study on acute intestinal obstruction was aimed at studying the age and sex distribution, various etiologies, clinical presentations, treatment and outcomes of acute intestinal obstruction.

Acute intestinal obstruction remains to be one of common surgical surgeries. Males are commonly affected mostly during their fifth decade. Obstructed/ strangulated inguinal hernia remains to be the most common cause followed by adhesions.

They usually present with abdominal pain with multiple air fluid levels in their X-ray abdomen erect view. The initial management of patients with acute intestinal obstruction should focus on aggressive fluid replacement, decompression of the obstructed bowel, and on prevention of aspiration. Surgery remains the cornerstone of treatment.

Earlier diagnosis and timely intervention are associated with excellent prognosis. Delayed diagnosis leading to strangulation and increased age are associated with poor outcomes.

ANNEXURE

PROFORMA

SL.NO :

NAME: AGE/SEX: IP NO:

DOA: DOS: DOD:

CHIEF COMPLAINTS:

HISTORY OF PRESENTING ILLNESS:

- ABDOMINAL PAIN
- VOMITING
- ABDOMINAL DISTENSION
- BOWEL HABITS
- H/O HAEMATEMESIS/MALENA
- H/O PASSING BLOOD IN STOOLS
- H/O PASSING WORMS IN STOOLS
- H/O JAUNDICE

- H/O FEVER
- H/O LOSS OF APPETITE/LOSS OF WEIGHT

PAST HISTORY:

- H/O DIABETES MELLITUS/SHT/VALVULAR HEART DISEASE/ATHEROSCLEROSIS
- H/O TUBERCULOSIS
- H/O GALL STONES
- H/O PREVIOUS ABDOMINAL SURGERIES

PERSONAL HISTORY:

- NUTRITION
- SMOKER/ALCOHOLIC
- BLADDER AND BOWEL HABITS
- SLEEPING PATTERN

DRUG HISTORY:

- H/O ASPIRIN / HEPARIN /WARFARIN INTAKE

MENSTRUAL HISTORY:(FEMALES)

OBSTETRIC HISTORY: (FEMALES)

FAMILY HISTORY:

GENERAL EXAMINATION:

- APPEARANCE
- ATTITUDE
- HYDRATION
- PALLOR
- ICTERUS
- CLUBBING
- CYANOSIS
- GENERALISED LYMPHADENOPATHY
- PEDAL EDEMA

VITAL SIGNS:

- PULSE
- BP
- RR
- TEMPERATURE

ABDOMINAL GIRTH:

SYSTEMIC EXAMINATION:

ABDOMEN EXAMINATION:

INSPECTION:

- SHAPE
- DISTENSION
- RESPIRATORY MOVEMENT OF EACH QUADRANT
- VISIBLE PERISTALSIS
- POSITION OF UMBLICUS
- VISIBLE MASS

- SCAR
- SKIN CHANGES
- HERNIAL SITES
- RENAL ANGLE
- SUPRACLAVICULAR FOSSA

PALPATION:

- TENDERNESS/REBOUND TENDERNESS
- MUSCULAR RIGIDITY/GUARDING
- CUTANEOUS HYPERAESTHESIA
- PALPABLE COILS OF INTESTINE
- ANY MASS PALPABLE
- HERNIAL ORIFICES
- SUPRACLAVICULAR FOSSA
- TESTIS

PERCUSSION:

AUSCULTATION:

DIGITAL RECTAL EXAMINATION:

- BLEEDING P/R
- BALLOONING OF RECTUM
- MASS PER RECTUM

P/V EXAMINATION:

OTHER SYSTEM EXAMINATION:

- CVS:
- RS :
- CNS:
- EXAMINATION OF SPINE:
- EXAMINATION OF CHEST & CHEST WALL:

INVESTIGATIONS:

- ✓ URINE ROUTINE
- ✓ CBC
- ✓ RFT
- ✓ SERUM ELECTROLYTES
- ✓ BLOOD GROUPING & TYPING
- ✓ X RAY – CHEST PA VIEW
- ✓ X RAY ABDOMEN ERECT
- ✓ USG ABDOMEN & PELVIS
- ✓ CT ABDOMEN PLAIN & CONTRAST
- ✓ ECG IN ALL LEADS

PRE-OPERATIVE DIAGNOSIS:

INTRA OPERATIVE FINDING:

SURGICAL PROCEDURE:

POST OPERATIVE COMPLICATIONS:

HPE REPORT OF THE SPECIMEN:

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S.NO	NAME	AGE	SEX	IP NO	ABD PAIN	VOMITING	CONSTIPATION	DISTENSION	X-RAY ABDOMEN	SITE OF OBST.	DIAGNOSIS	PROCEDURE
1	Malai kannu	56	M	57925	+	+	-	-	MAFL, DBL	small bowel	obst. Inguinal hernia	hernia repair
2	Kansha moideen	75	M	58290	+	+	-	+	DBL	small bowel	obst. Inguinal hernia	hernia repair
3	Annadurai	43	M	58921	+	+	-	-	MAFL	small bowel	obst. Inguinal hernia	hernia repair
4	shanmuga sundaram	52	M	55351	+	-	+	+	MAFL	large bowel	rectal growth	colostomy
5	Bama	75	F	54852	+	-	+	+	MAFL	large bowel	rectal growth	colostomy
6	Kottursamy	75	M	53209	+	-	-	+	MAFL	large bowel	descending colon growth	resection and anastamosis
7	Vignesh kumar	27	M	54845	+	+	+	+	BITA	large bowel	sigmoid volvulus	resection and anastamosis
8	Jeyaraj	50	M	53743	+	+	+	-	MAFL	small bowel	obst. Inguinal hernia	hernia repair
9	Antony raj	60	M	52462	+	+	+	-	MFL	small bowel	obst. Inguinal hernia	hernia repair
10	Muthu kumar	17	M	51645	+	+	-	+	MAFL, DBL	small bowel	ileal ISS	resection and anastamosis
11	Jeyalakshmi	36	F	50935	+	-	-	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
12	Sudalai	55	M	50579	-	+	-	+	DBL	small bowel	obst. Inguinal hernia	hernia repair
13	Veerapandi	56	M	49640	+	+	-	+	MAFL, DBL	small bowel	internal hernia	resection and anastamosis
14	Boaz	17	M	49365	+	-	+	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
15	Antonyammal	53	F	49333	+	+	+	-	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
16	Harikrishnan	65	M	48573	+	-	+	+	MAFL	small bowel	obst. Inguinal hernia	hernia repair
17	Selvi	62	F	46908	+	+	+	-	MAFL	small bowel	adhesive obstruction	resection and anastamosis
18	Parthiban	57	M	44369	+	+	-	+	DBL	small bowel	obst.umbilical hernia	hernia repair
19	Jeyabal murugan	62	M	42898	+	-	+	-	MAFL, DBL	small bowel	adhesive obstruction	resection and anastamosis
20	Petchiammal	72	F	42637	+	+	-	+	BITA	large bowel	sigmoid volvulus	resection and anastamosis
21	Mahesh	35	F	41898	+	+	-	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
22	Kanagalakshmi	45	F	41735	+	+	+	+	MAFL	small bowel	adhesive obstruction	adhesiolysis
23	Arumugam	45	M	40495	+	+	-	-	MAFL, DBL	small bowel	obst. Inguinal hernia	hernia repair
24	Valliammal	60	F	38849	+	-	+	+	MAFL, DBL	small bowel	obstructed femoral hernia	hernia repair
25	Sudalaimuthu	50	M	38423	+	+	-	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
26	Subramanian	52	M	37030	+	+	+	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
27	kasi	55	M	36793	-	-	+	-	DBL	small bowel	obst. Inguinal hernia	hernia repair
28	Paapathi	65	F	36762	+	-	-	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
29	karthik	30	M	36411	+	+	+	-	MAFL, DBL	small bowel	obst. Inguinal hernia	hernia repair
30	Rajasekhar	50	M	32584	+	-	+	+	MAFL	large bowel	sigmoid colon growth	colostomy
31	Ramaiah	65	M	33722	+	+	-	+	MAFL, DBL	small bowel	obst. Incisional hernia	release and repair
32	Ayyakutti	62	M	32996	+	+	+	-	MAFL	small bowel	obst. Inguinal hernia	hernia repair
33	Parvathi	65	F	30542	+	+	+	-	MAFL	small bowel	obst.umbilical hernia	hernia repair
34	Duraipallam	72	M	31496	+	-	-	+	DBL	small bowel	SMA syndrome	resection & anastamosis
35	Meenatchi sundaram	59	M	30474	+	+	+	-	MAFL, DBL	small bowel	obst. Ingunal hernia	hernia repair
36	Arumugam	24	M	28985	+	+	+	-	DBL	small bowel	obst. Ingunal hernia	hernia repair
37	karthika	28	F	28168	+	+	+	+	MAFL, DBL	small bowel	adhesive obstruction	resection & anastamosis
38	Valarmathi	53	F	28075	+	-	-	+	MAFL, DBL	small bowel	adhesive obstruction	resection & anastamosis
39	Sakthi kannan	20	M	27159	+	+	+	-	MAFL	small bowel	ileal stricture/tb	
40	Amutha	38	F	25571	+	+	+	+	MAFL, DBL	small bowel	obst. Incisional hernia	resection & anastamosis
41	Narayanan	25	M	25059	+	-	-	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
42	Sivasankaran	76	M	24861	+	+	+	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
43	Ammu	80	F	23116	+	+	+	-	DBL	small bowel	obst.umbilical hernia	hernia repair

S.NO	NAME	AGE	SEX	IP NO	ABD PAIN	VOMITING	CONSTIPATION	DISTENSION	X-RAY ABDOMEN	SITE OF OBST.	DIAGNOSIS	PROCEDURE
44	Esakki	70	M	22049	+	+	-	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
45	Chellapoo	63	F	21536	+	+	+	-	MAFL	small bowel	obst. Incisional hernia	hernia repair
46	Sankunthala	33	F	19740	+	+	-	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
47	Radha	70	M	18725	+	-	-	+	MAFL, DBL	large bowel	sigmoid colon growth	resection & anastamosis
48	Madasamy	70	M	17496	+	+	+	-	MAFL, DBL	large bowel	descending colon growth	colostomy
49	Subramanian	70	M	17112	+	-	+	-	MAFL	small bowel	obst. Incisional hernia	hernia repair
50	Muruga raj	15	M	14893	+	+	+	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
51	Thangam	65	F	13830	+	+	+	-	MAFL	small bowel	obst. Inguinal hernia	hernia repair
52	Akbar ali	62	M	13619	-	+	-	-	MAFL, DBL	small bowel	obst. Ingunal hernia	hernia repair
53	Pulugandi	43	M	13625	+	-	-	+	MAFL	small bowel	adhesive obstruction	adhesiolysis
54	Palaniammal	48	F	69591	+	-	+	+	MAFL, DBL	small bowel	obst. Incisional hernia	resection & anastamosis
55	Kuppatchi	65	F	55871	+	+	-	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
56	Saraswathi	56	F	51966	+	-	-	+	MAFL	large bowel	rectal growth	colostomy
57	Janne begum	58	F	26224	+	+	-	+	MAFL, DBL	small bowel	obst. Paraumbilical hernia	hernia repair
58	Sathish kumar	23	M	23145	+	+	+	-	MAFL	small bowel	obst. Inguinal hernia	hernia repair
59	Veerapandi	48	M	14578	+	+	-	-	MAFL, DBL	small bowel	obst. Incisional hernia	hernia repair
60	kanagavalli	31	F	78255	+	+	+	-	MAFL	small bowel	obstructed umlical hernia	hernia repair
61	Satheesh kumar	23	M	75949	+	-	-	-	MAFL	small bowel	obst. Ingunal hernia	hernia repair
62	Thangapandi	65	M	75329	+	+	-	-	MAFL, DBL	small bowel	obst. Ingunal hernia	hernia repair
63	Saraswathi	58	F	74254	+	-	-	+	MAFL	small bowel	obst. Ingunal hernia	hernia repair
64	Mariammal	40	F	71630	+	+	-	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
65	Sudalai	45	M	72078	+	+	-	+	MAFL, DBL	small bowel	intestinal Tb	resection & anastamosis
66	Subbulakshmi	52	F	70510	+	-	+	+	MAFL	large bowel	rectal growth	colostomy
67	karuthapandi	33	M	65070	+	+	+	-	MAFL	small bowel	obst. Ingunal hernia	hernia repair
68	Pitchammal	61	F	64871	+	-	-	+	MAFL, DBL	small bowel	obst. Paraumbilical hernia	hernia repair
69	Raj kumar	28	M	64647	+	+	-	-	DBL	small bowel	SMA syndrome	resection & anastamosis
70	Chellasamy	65	M	62113	+	+	-	+	DBL	small bowel	obst. Ingunal hernia	hernia repair
71	Mariammal	43	F	61146	+	+	+	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
72	Nagareddy	54	M	60765	+	+	-	-	MAFL, DBL	small bowel	obst. Inguinal hernia	hernia repair
73	Lakshmi	55	F	57035	+	+	-	+	MAFL	small bowel	obst. Incisional hernia	hernia repair
74	Katheeja beevi	71	F	56525	+	+	-	-	DBL	small bowel	obst. Inguinal hernia	hernia repair
75	Saravanan	33	M	56336	+	+	-	+	BITA	large bowel	sigmoid volvulus	resection & anastamosis
76	Esakkiammal	30	F	54789	+	+	-	+	BITA	large bowel	sigmoid volvulus	resection & anastamosis
77	Leelavathi	62	F	54419	+	-	-	+	MAFL, DBL	small bowel	obst.incisional hernia	resection & anastamosis
78	Masanam	56	M	51139	+	+	+	-	DBL	small bowel	obst. Inguinal hernia	hernia repair
79	Moorthy	45	M	48056	+	+	-	-	MAFL, DBL	small bowel	adhesive obstruction	hernia repair
80	Kannan	37	M	47833	+	+	-	+	BITA	large bowel	sigmoid volvulus	resection & anastamosis
81	Rajendran	28	M	47625	-	-	-	-	DBL	small bowel	obst. Ingunal hernia	hernia repair
82	Mani	37	M	47594	+	+	+	-	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
83	Devaraj	43	M	47286	+	+	-	-	MAFL, DBL	small bowel	obst. Incisional hernia	resection & anastamosis
84	Ramachandran	66	M	38941	+	+	-	+	BITA	large bowel	sigmoid volvulus	resection & anastamosis
85	Arumugam	61	M	39299	+	+	-	+	MAFL, DBL	small bowel	ileal stricture/tb	resection & anastamosis
86	Selvaraj	55	M	39920	+	+	+	-	DBL	small bowel	obst. Inguinal hernia	hernia repair

S.NO	NAME	AGE	SEX	IP NO	ABD PAIN	VOMITING	CONSTIPATION	DISTENSION	X-RAY ABDOMEN	SITE OF OBST.	DIAGNOSIS	PROCEDURE
87	Periyasamy	56	M	39869	+	+	+	+	MAFL, DBL	small bowel	adhesive obstruction	adhesiolysis
88	Chandrasekhar	25	M	37398	-	-	-	-	DBL	small bowel	obst. Ingunal hernia	hernia repair
89	Sheikh	55	M	37155	+	-	-	+	MAFL	large bowel	rectal growth	colostomy
90	Sundaramani	45	M	35998	+	+	-	-	DBL	small bowel	obst. Ingunal hernia	hernia repair
91	Petchiammal	50	F	35231	+	-	+	+	MAFL	large bowel	rectal growth	colostomy
92	Sokkalingam	70	M	35745	+	-	-	+	MAFL, DBL	large bowel	Carcinoma Ascending colon	resection & anastamosis
93	Kali	33	M	33959	+	+	-	+	MAFL, DBL	small bowel	adhesive obstruction	adhesion release
94	Thangapandi	75	M	32768	+	+	-	-	MAFL, DBL	small bowel	obst. Ingunal hernia	hernia repair
95	Kamalam	63	F	32617	+	+	+	+	MAFL, DBL	small bowel	adhesive obstruction	adhesion release
96	Muthulakshmi	55	F	32309	+	+	+	-	MAFL	small bowel	adhesive obstruction	resection & anastamosis
97	Kanagaraj	60	M	31635	+	-	-	-	DBL	small bowel	obst. Inguinal hernia	hernia repair
98	Esakkipandi	57	M	30780	+	+	+	-	MAFL	small bowel	adhesive obstruction	adhesiolysis
99	Lingaraj	28	M	29647	+	+	-	+	MAFL, DBL	small bowel	ileal stricture/tb	resection & anastamosis
100	Jagatheesan	74	M	29187	-	-	-	-	MAFL, DBL	small bowel	obst. Ingunal hernia	hernia repair